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NOTICE TO BINDER.

Volume LVII has been issued in two parts, each containing the "Journal" proper, paged in Arabic figures, and "Extracts from the Proceedings," paged in Roman figures. This title and contents sheet should be placed first, and be followed by pages 1 to 156, then by pages 157 to 378. After that should come "Extracts from the Proceedings," pages i to l, then pages li to cxxvii, concluding with the General Index.

JOURNAL

OF THE

ROYAL HORTICULTURAL SOCIETY.

VOL. LVII. PART I. 1932.

VARIETIES OF FRUIT FOR GARDENS.

By C. G. A. NIX, V.M.H.

[Read October 6th, 1931; Mr. E. A. BUNYARD in the Chair]

WHEN the Council asked me as an amateur to give a lecture, at the Fruit Show, on Fruit, I felt rather nervous and awkward, because fruit is such a vast subject; nobody can deal with the whole thing in one lecture—an amateur as a rule is not competent to deal with any subject thoroughly. But it struck me that one branch of fruit growing has been very much neglected in this country up to the present time. There is an extraordinary lack of knowledge of one phase of fruit growing amongst the owners of the smaller gardens, and the amateur who does everything himself—I mean a knowledge of the large number of excellent varieties of fruit that can be grown in this country with little trouble. It is no more trouble really to grow three or four varieties of fruit than it is to grow one. Therefore I thought it might be interesting to talk to-day on varieties of fruit and how the smaller gardener can do a great deal and get a great deal more interest out of his garden than at present.

It is no intention of mine to stand here and give you long lists of names. I want to point out how very much variety anybody can obtain if they will take a little trouble and thought. My remarks are just to the smaller gardener and the amateur; the owner of the big garden with a professional head gardener does not require much assistance or advice.

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I should like to call your attention first of all to the fact that the Royal Horticultural Society has just republished its List of Hardy Fruits for Private Gardens. That has been revised within the last six weeks by the Fruit and Vegetable Committee of the Society, and it contains lists of Apples, Pears, Cherries, Peaches, Plums, etc. The list does not profess to give a great number of varieties, but attempts to recommend certain varieties that almost anybody can grow in any part of the country. It is very valuable and up to date, and on the last page contains a most interesting group of names under the heading "New and Less known Varieties that show promise." Those people who are keen on their fruit gardens and fruit growing would do well to consult this last page if they want to add to the variety of fruits in their gardens.

A great many Fellows of the Society do not know of the work that has been done, and is being done, by the raisers of new varieties. Many people in this country have given up their time, and used their brains, for production of new varieties of existing fruits. Their work has been extraordinarily successful, but amongst the amateurs and smaller gardeners it is not very well known. The smaller gardener would do very well to try and get into touch with the productions of our professional raisers who have done so much within the last eight or ten years.

There is a great deal of importance to be attached to this question of varieties. I am often asked by people to give them a list of Apples or Pears that they can grow in their garden. I am always extremely chary of doing this, because one does not like to gain the reputation of landing somebody with a hopeless "wrong 'un." Therefore I always advise people who consult me in that way to go and see a gardener in their own neighbourhood or, better still, to consult their local nurseryman, who will tell them what varieties are suitable for their particular district. I recommend everybody to take advice before they plunge into growing a variety about which they know nothing.

In selecting varieties for any garden you have to consider your climate, locality, soil and the space available; also you must think about the season at which you want your fruit. Only this morning a very well-known garden owner came up to me and said: "There is only one apple worth growing, that's 'Cox's,' and only one pear, that's 'Comice.'" I replied: "That is all very well up to November, but there are excellent dessert apples and dessert pears from November to February, and some up to the end of March and April. You are altogether wrong, because you do not take the trouble to find out the good varieties." It is quite possible, with a very small garden, if you select varieties that are suitable for growing, to extend your season from September to the end of March, or even the beginning of April. Every garden that professes to be a garden should make some effort to extend its season and provide itself with fruit, and not be dependent upon the foreigner or the colonial for Apples and Pears after 'Cox's Orange' and 'Doyenne du Comice' are finished.

I want to show you to-day how, in comparatively small places, you can, with a little foresight, care and taking advice, provide yourself with sufficient varieties to carry on through the winter season as regards Apples and Pears. There are other fruits, but the subject is too big, and I shall stick closely to those two fruits.

With a small garden it is absolutely essential that you should only have the best varieties for cooking or eating; you cannot have many trees, and it is essential you should have these in the best form. If your space is limited you cannot afford to have it wasted by great, straggling trees that occupy too much room. Fig 1 will illustrate what I mean. The trees shown are all bushes of 'Lane's Prince Albert.' It is a fine Apple, but it has one great defect, it makes a spreading, sprawling tree, and although it crops well and is a good cooker it is unsuitable for a small garden. We can only keep it from coming over the paths by putting sticks and tying the bushes up. You are wasting space by growing that Apple when you can grow another variety which is quite as good for cooking purposes and lasts quite as long—viz. into March. The Apple I recommend in its place occupies far less space and can be used in the same months; you are wasting space by growing an unsuitable variety in a small area.

There is another type of tree (fig. 2) unsuitable for a small garden—the standard. The picture shows a standard of 'Crawley Beauty,' a very good late cooking Apple. The amount of ground that tree occupies is 412 square feet; that means if you have a limited area you are growing an Apple for one season which occupies a great deal of space which could be far better used in growing two or three varieties; there is nothing against the Apple, it is only the form in which it is grown.

Fig 3 is rather a difficult picture to describe. It represents part of a small area in my orchard at home. There are two rows of trees the front row contains nine trees and the back row ten; the width from the outside of the back row is 16 feet. Therefore in a space 87 feet long by 16 feet wide you can have 19 bush trees. You are able, in a comparatively small space, to have 19 bushes, which will allow of some six, seven, or eight varieties of Apples; 1392 square feet is the area, that is only three and a half times the area occupied by that standard tree which you saw in the other picture. Therefore for the small garden it is quite obvious that if you wish to go in for varieties you must grow suitable trees in a suitable form, namely bush trees, and as far as possible you must select varieties of upright growth, such as 'Edward VII,' fig 4.

This Apple should take the place of 'Lane's Prince Albert'; it is an equally good cooker, a good fruiting Apple, and of extraordinarily erect growth. It is clearly better for the small gardener to grow an Apple of that class, which occupies very little room and is a good cropper and cooker, than one of these straggling Apples on which you are wasting space. I have given these pictures to show you how, by selecting trees of upright growth and good varieties, you can pack your trees very closely and have room for sufficient varieties to extend your season. These trees (fig. 4) are planted the same distance apart and occupy the

same width of ground as shown in the slide we have just seen with 19 trees. This is rather a difficult limit, only to grow the upright varieties, but I am talking to people who have to deal with a small space.

It is unfortunate that some of the very best Apples have not got the upright habit of growth. There is an Apple called 'Lord Hindlip,' a very good after-Christmas fruit. It is a variety that everyone who has room should grow; it seems to do best when it is not pruned but allowed to straggle all over the place. I do not know whether this is the case all over the country, but it certainly is so with me. I am told it is possible to grow this variety pruned like other bush trees, and if that is so, then it is an Apple that everyone should grow for use in January and February. On some soils there is no better Apple at that time of year, and it is well worth a trial.

It is a difficult thing to mention a list of names. Therefore, before you start on any variety you should consult somebody with local knowledge, such as a nurseryman or a large gardener in your neighbourhood, and ask him for the names of varieties, and, if possible, ask him to let you see them growing so that you can get some idea as to whether they are suitable for a small garden, and see that they do not occupy too much room.

Anybody who wished to have their Apple season from September to February or March could cover that with about five or six bush Apples of excellent flavour—'St. Everard' is an excellent September Apple; 'Cox's Orange Pippin,' which we all grow when we can—personally I am not very successful with it; 'Laxton's Superb,' 'American Mother,' 'St. Cecilia,' 'Orleans Reinette.' These should take you from September to March without having to go to the fruiterer or the foreigner or even the colonies.

One of the things people are always saying to me is: "I have such-and-such an Apple. I don't care for it very much, but I do not care to cut it down; it seems a waste to sacrifice it, it is a big bush, but rather a poor variety." They feel it will be a good many years before they can replace it with another variety. That is a great mistake to make, because having once got your tree, if you find you do not like it, or that it does not do well, it is so easy to replace it with some other variety. It gives you the opportunity of experimenting with some new variety that you have heard of or seen. Somebody, perhaps, gives you an excellent Apple and you say: "I should like to have that." It is quite possible to do it by a simple method known as regrafting.

Some years ago an Apple was brought out called 'Ontario' (fig. 5), a very fine, late, cooking Apple. The fruit last year was in excellent order for cooking at the beginning of June, it was no trouble to keep; it is a hardy Apple, fertile and quick growing. I got a tree of it, and then we found we had got some trees of an Apple called 'Bury Hill Pippin,' which were no good to us—we did not care about the Apple. We headed them back on top and grafted them with 'Ontario' prunings. Those trees are 10 feet high, they are only eight years from regrafting, and they began to fruit the second year from regrafting; they have fruited very

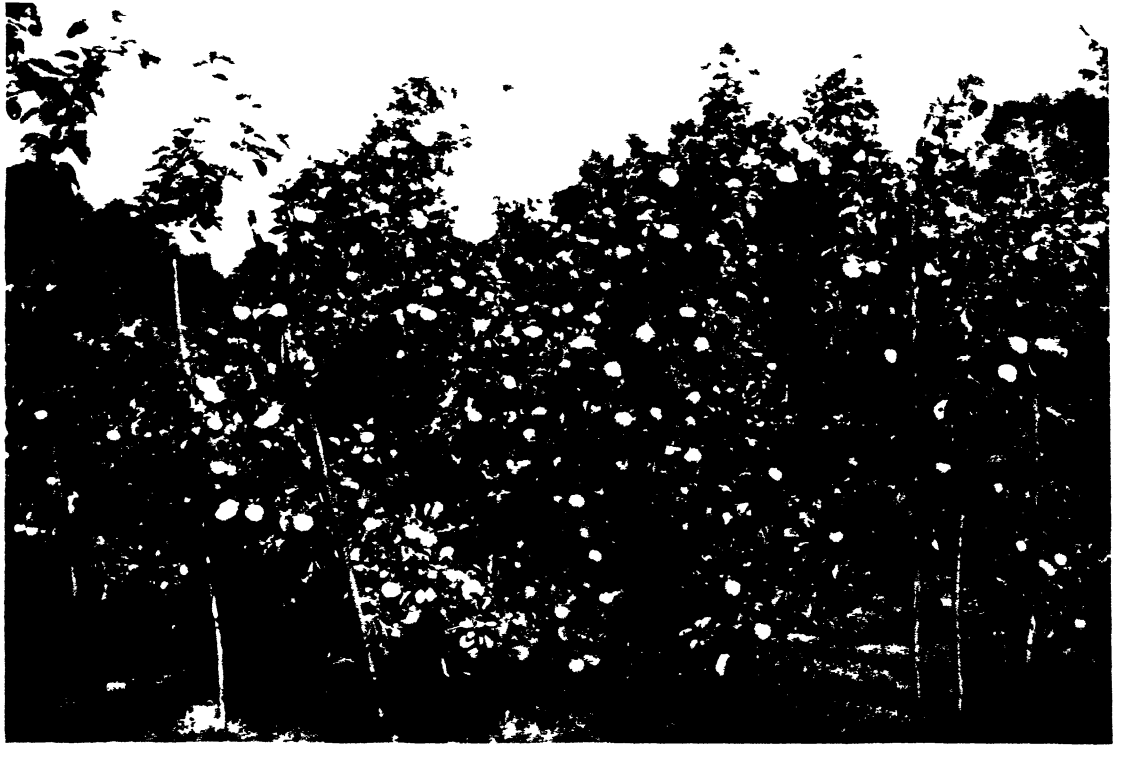


FIG. 1. ALTEE PANES, PRINCE ALBERT

[To face p. 4



Fig. 2.—Netel 'Crawley Beauty' as a Standard

well every year since. By adopting that method you can get an excellent variety into your garden with the minimum loss of time; in a short time you have strong, healthy fruiting bushes growing.

'Cox's Orange Pippin' is an Apple I do not do well with; a great many people find difficulty in growing it. Some trees of this variety were headed back, and regrafted only five years ago with an Apple which is an excellent Apple as regards flavour, a fine dessert Apple, which comes in just after 'Cox's' and lasts for some weeks, called 'Laxton's Superb.' The trees are only five years from the regraft, and are already 9 feet high; they have been fruiting for three years. It is a very easy method of getting new varieties into your garden with the minimum of sacrifice; in four years you have fruiting trees of considerable size. If you do that, it enables you to "play with" new varieties quickly, try them out and see whether you like them. All you have to do is to head back some variety you do not like and try a new variety on it.

In April of this year a tree of 'Boston Russet' was regrafted with 'Bramley's.' After six months (fig. 6) it is 6 feet high, and in all human probability will have a fruit or two next year, and by 1933 it should be a fair-sized, fruiting tree. That is what you can do in a comparatively short time. It was an old variety and not a new one, but that does not affect the argument. All Apples do not grow as freely as 'Bramley's,' but that is an instance of what can be done.

There are other methods of economizing space, so important in the small garden if you wish to increase the number of your varieties. Bushes and standards occupy a certain amount of room, but cordons occupy an extraordinarily small amount of space, and you can have half a dozen cordons where you would hardly have room for a bush tree; you can utilize a fence, you can make a screen, and by taking advantage of odd corners you can, again with the minimum of space, have a considerable increase in the amount of your fruit and the number of your varieties. You can easily make a cordon fence (fig. 7) with wooden posts and wire. The cordons are 10 feet high, and there is a tremendous lot of fruit all down them. You can get seven cordons into a 10-foot run of fence, so that with a very short run of fence, about 20 feet, you can put in thirteen or fourteen cordons in several varieties of Apples or Pears—probably Apples do better. If by any chance you get an Apple that you do not like, or that does not do well, it is an extremely simple and quick matter to replace it.

Cordons three years old, top-grafted with varieties from my own orchard, are 6 to 7 feet high; they are fruiting already, and in another year or so there will be a fine fruiting fence on a very short space. In 20 feet you have twelve or thirteen cordons with five or six varieties, and you are adding enormously to the production of fruit in your garden. If you get a year when some varieties do not fruit, it is almost certain that some other varieties will be bearing. You can utilize odd corners by putting up an ordinary fence with wooden posts or wires, and the actual space occupied is only that of a narrow hedge; it occupies very

little room, and if put in the proper position keeps very little sun or light off anything else. You can grow flowers in front if you like, as you will see in fig. 8 of an espalier tree very heavily cropped. Just in front of it is part of a herbaceous border, which runs right through my kitchen garden. The actual width is only very narrow, perhaps a couple of feet. You can thus utilize odd spaces by growing espalier trees.

I like my cordons about 10 feet high. It is a very convenient height, as you can get up for pruning and gathering your fruit on a very small pair of steps. Those of you who wish to add to the number of your varieties should consider getting cordons in some form or other.

In nearly every garden you will find that there is some possibility of using a wall. It may be the garden wall or the wall of your house, or the wall of a garage, and very often there are odd spaces of wall that are simply wasted by being covered with ivy and other useless subjects, which could be perfectly well utilized for growing Pears. You can grow Pears on cordons or espaliers, and when you have walls they should be utilized to the best advantage (fig. 9). An espalier tree occupying a space of 12 feet by 10 feet high means only one variety in that space. It is a great mistake to use a piece of wall like that for only one variety, because if you had a very big crop you could not eat all the fruits while they are at their best. When your one variety is finished you have nothing to follow. Why not utilize that space by growing nine cordons in variety? In the same space of wall you can probably have two or three varieties, and when your 'Comice' is finished in November you can carry on with the other later Pears, and have something to look forward to. If you have enough space, you may even have some as late as February. The space occupied by one espalier tree can be perfectly well occupied by nine cordons.

You can have good crops from cordons. I counted 56 fruits of 'Winter Nelis' on one cordon this year, and a rough count showed there were 250 fruit on five cordons. Probably three or four cordons of one variety are sufficient, and you could put in a late variety like 'Josephine de Malines,' a delicious Pear after Christmas, or another Pear called 'Duchesse de Bordeaux.' If you put in those two, you would have something to look forward to when most people are getting to the end of their fruit. By using your spare spaces you can get a succession of Pears from September right up to the end of February, such Pears as 'Thompson's,' 'Comice,' 'Winter Nelis,' 'Josephine de Malines' and the 'Duchesse de Bordeaux' will carry you through for six months in the year. Every gardener, however small his garden, ought to make some attempt to get the greatest number of varieties he can into a limited space, and it can be done by just a little thinking.

I think there is nothing more horrible than to see half a dozen or more great, straggling Gooseberry bushes growing all over the place. They take up a lot of land, and you cannot get at the Gooseberries because they prick your hands. Why not grow Gooseberries on your fence? You can get in four cordons to every 10 feet, with four or five

stems, and perfectly easy to get at for pruning or picking; it also enables you to have three or four varieties in your garden, one or two for picking green, such as 'Lancer' and 'Leveller,' and one or more of the high-class dessert Gooseberries like 'Langley Gage.' If you have room, you can grow your Red Currants in the same way (fig. 10), and by utilizing all the space you have room for a greater number of varieties.

The point I want to make is that it is possible by using a little forethought, by looking for odd corners and by selecting and learning about suitable varieties of suitable growth, even in a small garden in this country, to grow a very great deal more fruit than you do at the present time. You can, by a judicious use of varieties, extend your season. By enquiry, and reading the JOURNAL of the Royal Horticultural Society, where the reports of Committees are published, you can have great pleasure in trying new and, in many cases, improved varieties; and apart from the economy and profit you can add very greatly to your pleasure and amusement in fruit growing.

Of course there are many other varieties of fruit that we grow in our gardens. The same remarks apply to all of them, more particularly in regard to Plums. I am always being told by people: "It is no use my trying to grow plums, my tree never has any plums." I would warn amateurs and those without knowledge that if they want to grow Plums it is absolutely essential if you do not select in the first instance a self-fertile variety that you should have two varieties, or you will never get any fruit at all—apart from bad seasons, you will have no crop unless you have two varieties. There are self-fertile Plums and self-sterile—some of the best dessert Gages are self-sterile, and you must have two varieties before you can get any crop. The same applies to Cherries. You require cross-fertilization between groups. I do not know much about this subject, but it is no use growing one Cherry tree, because you may have landed yourself with a self-sterile variety.

When it comes to a question of laying out a new garden, do try and think out how, by a judicious use of varieties and the best forms of growth, you can make the most of your gardens, and for the sake of your own pleasure and profit try and extend your season throughout the year.

THE GENUS AMARYLLIS, INCLUDING ITS BI-GENERIC AND OTHER HYBRIDS AND CROSSES.

By A. WORSLEY.

[Read April 28, 1930; Mr. E A BOWLES, M A., F.L S., F E S., V M H., in the Chair.]

I HAD intended to treat of the exotic Amarylliae, but the title given covers a field quite wide enough for a single paper, and enables me to deal with many details which would otherwise have had to be omitted. I shall therefore restrict myself to the genera Amaryllis and Brunsvigia as defined by Baker, and to Crinum in part.

I have purposely cut out the matter contained in the mass of literature referred to at the end of this paper, which anyone who desires may study at leisure. Hence you must not expect to find here a general résumé of the subject. It is rather an amplification of certain sections already published.

Amaryllis has been in cultivation in our gardens for 220 years, and a Brunsdonna (but not under that name) was shown in flower before the Royal Horticultural Society on August 18, 1875.

In our JOURNAL, **51**, pp. 64–67, you will find all that was then known as to Brunsdonnas both from an historical and a cultural point of view. There is little doubt but that, up to the end of last century, all Brunsdonnas in British gardens originated in Australia (Bidwell) excepting (at most) two natural hybrids introduced from S. Africa, but all of which appear to have died out under cultivation in Britain. These Australian hybrids came to us about 1875, and were in 1889 known under the name of *Amaryllis* Arbuckle's var. and were distributed from the Royal Gardens, Kew. I have recently had two forms sent me straight from Australia which have not flowered here. In the present century Mr. JOHN HOOG, of Messrs. VAN TUBERGEN, and myself have both raised hybrids between *Amaryllis* and *Brunsvigia Josephinae*. HOOG raised hybrids both ways, and those he raised on Brunsvigia are very dissimilar plants from those raised on Amaryllis, thus perplexing (in this single instance at least) those pundits who declare that whichever way a hybrid is raised it must bear the same name, and perplexing also those who deal in these plants, and who must follow the accepted nomenclature however much it may be contradicted by the appearance of the hybrids themselves.

These Amaryllis grow in warm temperate regions, and their flowering is erratic in cool temperate regions. Brunsvigias and Brunsdonnas are still more shy. No one has solved the problem of why this is so, but the shortened period of heat and of sunlight must be given due importance. Irregular rainfall also interferes with the normal



FIG. 3. NINETEEN BUSH ALLIGATORS IN A SPACE 57 FEET [illegible] FEET

[To face p. 8



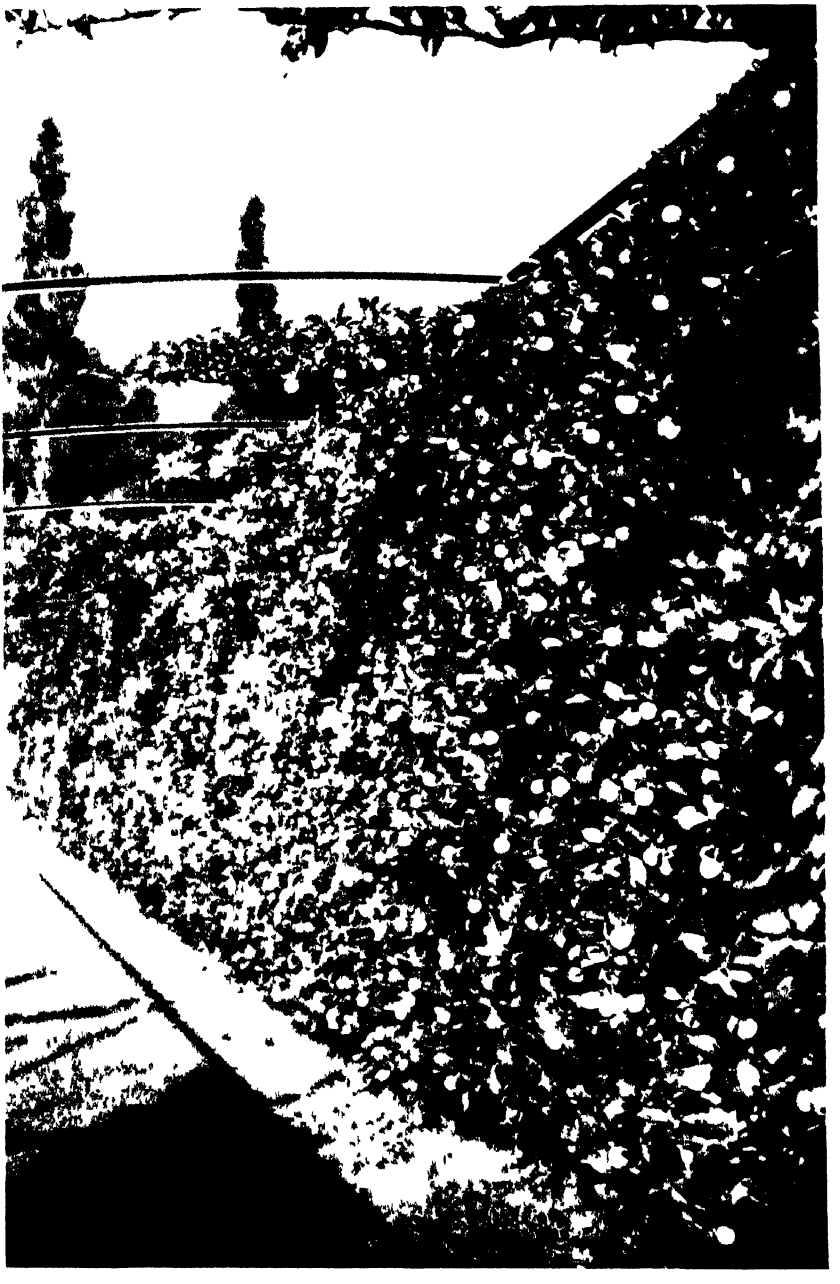
FIG. 4.—APPLE EDWARD VII SHOWING UPRIGHT GROWTH



FIG. 8.—VELIE "ONTARIO" 1, 2, 3) FORGRAFTED ON "BUCK HILL PIPPIN"



FIG. 6.—ALFRED BEAMISH'S SKELETON, EXHUMED ON 1ST JANUARY 1911 (p.)



[illegible]





FIG. 9.—LEATHER PEAR, DOYENNÉ DU COMICE, OCCUPYING SPACE 12 FT. × 10 FT., AND CORDON PEARS IN A SIMILAR SPACE (p. 7)



FIG. 10.—GOOSEBERRIES AND RED CURRANTS GROWN AS CORDONS ON FENCE

growing and resting periods. But there is some other factor also, for, when planted out under glass, their flowering is still shy and erratic. Nor can we be sure that Amaryllis are always free-flowering even in warm temperate areas. I was told that they flowered freely every year in Grand Canary, and on inquiring about how many flowered in a certain plot of garden in an hotel patio I was told about a hundred. But on digging down a few inches I found a tightly packed cuirass of bulbs, so that there must have been some thousands there. It is probable that some substance is lost to the bulb in producing flowers, and may not be replaced during several years of normal growth, and this period is extended in our climate by climatic uncertainties. I have found that good seasons for the flowering of ordinary Amaryllis out of doors have not occurred more than three times in the last 26 years (say once in 9 years) and that on several occasions 3 bad years have occurred in succession.

Under glass, or at the base of a heated wall, flowering is by no means so erratic. In the extreme S.W. of England *Amaryllis Belladonna* has become a kitchen garden border plant, but only a small proportion flower most years. The var. *rubra major* (sent out by VAN TUBERGEN) is the most reliable flowerer in my garden, and is one of the most beautiful of all Amaryllis. Under glass most bulbs of this variety will flower every year.

Brunsdonnas and Brunsvigias should not be grown out of doors in England except in specially favoured coast districts of the S.W., and in picked places there. In the Mediterranean area the flowers are much used in churches for altar decoration, and on that account only have been planted in many Catholic countries. This accounts for the rapid spread through the warm regions of the world more than a century ago.

The coloration of the basal sheath to the pseudo-stem is a sure indication of the extent and depth of the crimson colour which will appear in the flowers. If this basal sheath has no ruddy colour, the plant is an albino.

Hybridization has been effected with two species of Brunsvigia and with *Crinum Moorei*; some say also with Lycoris, but my efforts in this last direction have hitherto shown no result. So many hybrids raised with Brunsvigia prove that these two genera have been reconciled, but this occurred only twice with Crinum and both times with *C. Moorei*. On this slight basis one can hardly speak of reconciliation between the two genera. Hybridists should try to secure a hybrid between Amaryllis and *Nerine Bowdenii*, although the flowering periods do not quite coincide.

Decurrency of Varieties.

Some half-dozen named varieties have been put on the market by Dutch firms (some of them over half a century ago). In comparing those which may flower to-day with the plates published long since, we

cannot see any signs of decurrency. But it is doubtful if this absence of decurrency applies to Brunsdonnas. We all know how the Hyacinth gives one splendid spike of flowers, and that the same bulb never again produces such a fine spike. This result is produced by preventing the young bulb from flowering until it has had time to grow to its maximum size. Brunsdonnas do not require any art to prevent their flowering. The inclination of seedlings is to grow for 20 to 25 years (in our climate) to reach their maximun size of bulb, and then to carry a splendid scape of flowers. Probably the same bulb will never again carry such a fine scape—although this is not an invariable rule, for occasionally a seedling bulb will carry a precocious flower spike before it has reached its maximum growth of bulb, and a finer scape in some subsequent year, but this is a rare occurrence. We cannot, however, call this decurrency in any *permanent* sense, for the offsets from Brunsdonna seedlings will in their turn, and when they have reached their maximum growth of bulb, produce scapes as fine as those of the original bulb.

On the other hand, I have not, of recent years, seen any specimen carrying 30 to 40 flowers to the scape, such as has been recorded and figured in the past; but this may be due to climatic conditions having been of late years unfavourable.

Brunsvigias reproduce themselves freely from seeds, but very sparingly indeed by offsets. I have cultivated very many, and can just remember one offset bulb being formed. Brunsdonnas, on the other hand, produce a fair number of offsets, and by this means will double their number, even from the seedling stage, in about 12 years. Certainly one offset a bulb per annum, even for big bulbs, is above the average. *Brunsvigia Josephinae* takes about 30 years to flower from seed in England, Brunsdonnas from 8 to 22 years, and *Amaryllis Belladonna* 5 to 6 years. Crosses back between Brunsdonna and pollen of Amaryllis are inferior to Brunsdonnas. Those which flower in 4½ to 6 years will be barely distinguishable from Amaryllis, but those which flower subsequently will show at least some characteristics of Brunsdonna, and may be worth cultivating, but in general they will be good for Amaryllis, but poor Brunsdonnas. Brunsdonnas certainly do not flower with us on an average of more than once in 8 or 9 years. Typically they should carry 20 or more flowers to the scape, but if a bulb can be induced to flower more often, it will sink back into carrying umbels of only 8 to 12 flowers. I have seedlings which have carried up to 28 flowers to the scape, but not often; 40 flowers to a scape are on record. Fully grown bulbs of Brunsdonna may measure 4½ inches diameter, being thus intermediate in size between Amaryllis and *Brunsvigia Josephinae.*

The variety *Amaryllis Belladonna rubra major* carries 12 to 18 flowers to the scape as compared with the typical 8 flowers carried by *A. Belladonna.* They are brilliantly coloured, but rather narrow in their segments compared with their length of limb. As a seed-bearer this variety is valuable, as I have known a single fruit produce 56 seeds, of which 42 seemed perfect.

Generic Affinities.

There is no doubt but that Amaryllis and Brunsvigia are one genus, but I do not think we have got far enough to include Crinum in it.

The evidence for the former rests upon a large number of hybridizations effected by many hybridists and involving at least two distinct species of Brunsvigia. The evidence for including Crinum in the same genus rests upon two crosses affecting one species of Crinum only.

Amaryllis and *Brunsvigia Josephinae* have been crossed many times. I have effected hybridization both ways every time I have pollinated them. Bidwell, in Australia, also hybridized Amaryllis with *B. gigantea* both ways.

As to crosses with Crinum, I tried several species of Crinum, of which I once had a large collection. On sixteen occasions (many stigmas being pollinated on each occasion) I placed Crinum pollen on Amaryllis without raising a single fruit. On five occasions I tried Amaryllis on Crinum without raising fertile seeds, but on four of these occasions some sort of fruit was formed and what looked like seeds. As the most beautiful Crinums rarely produce seed in England it may well be that we may presently be presented with more evidence of affinity between these reputed genera.

Dr. RAGIONERI of Florence has placed on record hybrids between Amaryllis and Lycoris, but I have seen no record of verification by the flowering of these seedlings.

At Isleworth neither *Lycoris aurea* nor *L. squamigera* has ever carried seed, but on ten occasions I placed Lycoris pollen on Amaryllis. On three of these occasions fruit was formed, but no fertile seeds resulted.

Some day Amaryllis and Acis will be reconciled. I placed Amaryllis pollen on *Acis autumnalis* on four occasions, raising fruit *every time*, but no fertile seeds.

Crosses among Amaryllis of the Belladonna Type.

I know of none of these crosses of any merit raised in recent years. I have raised some, but none of them showed any marked advance on its parents, but often retrogression. It looks as though we possess optimum types of Amaryllis and that no further advance is probable unless by hybridization with pollen from the bi-generic crosses.

Bi-generic hybrids.—These have been so carefully recorded in JOURNAL R.H.S. and other publications that there is no need to repeat here what you can find there.

Amaryllis Belladonna rubra major.—Mr. W. WATSON believed this bulb to be a Brunsdonna. We examined it together and noted the very well developed pseudo-stem, but I did not feel able to agree with him. Since then I have only noted that it carries more seeds to the fruit than does any other variety of *Amaryllis Belladonna* which I have ever examined in fruit. Forty-two good seeds in one fruit is

an extreme number compared with some 8 to 12 which *A. Belladonna* usually bears. It was originally obtained by the late Mr. ELWES as *A. blanda*, from some unrecorded source. It is certainly worthy to be grown by all lovers of this class of bulbs.

Colour.—The presence of colour (even if such colour may, as some say, be merely an index of the presence of other characters, rather than an element vital to the plant) is one of the first indications of health noted by the gardener.

A slight variation in colour is to him a sign of something wrong, a variation often so slight that it would pass unnoticed by anyone who did not live with his plants. He picks that plant out, examines it, and, if he is wise, removes it to the hospital. In a general sense this is true of all organisms. The Cactus which assumes a pruinose colouring is too dry at the roots, and is striving to conserve whatever moisture is left to it by covering its stems up in a waxy exudation, and thus limiting evaporation. In humans, the coloration of the skin is an index to the health of the body. But is this coloration a mere index to the presence of other characters, or is it an index of the preservation, or of the decay, of processes vital to the life of the organism? I lean to this latter thesis in the main, but of course one must take species and kinds *sui generis*.

The question of albinism cannot now be discussed, but only coloration, and upon the connexion between coloration and vitality I have some interesting notes. The so-called albino Brunsdonnas have proved to be more delicate than the coloured forms. Purplish-rose is the colour shown by typical Brunsdonnas. Some colour segregation is visible, for, towards the bases of the flowers, the yellow is segregated out from the red component of the purplish-rose, and this latter colour is concentrated towards the apices of the flowers. Let us follow the incidence of this purplish-rose colour in the seeds and we shall find that it is in them an evidence of vitality. Taking ripe fruit of Brunsdonnas and Amaryllis, I divided the seeds out according to colour, discarding seeds of doubtful fertility or much undersized. I found half of them pink of varying intensity, a large number white or practically colourless, and a few of a full purple colour. On the maturity of the second leaf, these results were disclosed among the seedlings as follows:

Eighty-six seeds had produced 65 seedlings.

All the purple seeds had grown into vigorous bulbs exceeding in growth all the others.

Ninety-one per cent. of the pink seeds and 51 per cent. of the white or colourless seeds had produced bulbs.

Another fruit was similarly dealt with. Purple was absent from the seeds and the average percentage germination was lower, but followed the same scale—50 per cent. of the pink and 33 per cent. of the white seeds producing bulbs.

How much of the coloration of seeds is due to some of them receiving more sunlight than have others, and to what extent such



FIG. 11.—SWEET PEAS GROWING FOR SEED. MESSRS. PERRY MOSES RANCH, SALINAS, CALIFORNIA. (Part of 200 acres.)

(P. 11.)



FIG. 12.—HOLLOW CROWN PEA SNIP AND CHANTENAY CARROT GROWING FOR SEED ON MESSRS. PEKKY MORSE'S SACRAMENTO RIVER RANCH, CALIFORNIA

To face p. 13

surplusage of light has induced an excess of vigour in the seeds concurrent perhaps with a deeper coloration, would require a fresh set of experiments. But the *prima facie* view is that colour even in seeds " is an index of the preservation, or of the decay, of processes vital to the life of the organism."

Cultivation.—What the books say is not of much help to the cultivator of this class of plants. Had they proved of much help we should not record so many failures among cultivators. What is to be found in the books is often correct in a general sense, but the trouble arises in the application of this learning to particular cases. Climate, soil, situation, the sorts experimented with, whether the bulbs have been cultivated over here long enough to get acclimatized and to have altered their period of growth to suit our seasons, or whether they are just landed perhaps from the Southern Hemisphere—all these things contribute to success or failure. In order to meet the varied needs of particular cases, some modification in the formulæ of the books is needful, and what modification in procedure, or reversal of the instructions given, will suit each need cannot be learned from rules, but only by experience. It is the old trouble that the conceived " universal " can never be completely represented in the present " particular."

Nevertheless, I must say something more definite about cultivation. Amaryllis are not particular as to soil, provided it is porous. Gravelly or sandy soils are appreciated. We have been told that dry situations best suit the genus. But the only group of Amaryllis of which a great part died out at Isleworth was planted in a particularly dry place; and the fact that the genus has become a kitchen garden border plant on the coasts of Devon and Cornwall is proof that double the rainfall of the London area is no detriment to its cultivation.

The emission of the flower-scape from the root-stock occurs synchronously with the emission of new roots from the basal disk. This is one of the results of autumn rains, which, if unduly delayed, may keep back the emission of the flower-scape until the temperature has fallen too low for its growth. This is one of the causes why effete flower-scapes are often flung out of the bulbs in the following spring. Hence, if planted at the base of a wall or under glass, a series of floodings should be given to Amaryllis in the earliest days of August. Some seasons the bulbs outside get all they need, but rarely. Of this I am sure, and I *think* that an occasional flooding in mid-July also would be beneficial. It is noticeable that Amaryllis grown at the base of a wall devoted to Peaches often flower better than elsewhere, and in this position they get a July flooding or two. But Brunsvigias enjoy a longer drought period than do Amaryllis, and want more roasting to induce flowering. The roots of Amaryllis are deep-stricken, and in S. Africa receive torrential rains when it does rain. When we administer water our object should be *to flood*, so that the bulbs may soon become dry again, but the roots remain damp for a long time. On the Continent there are areas where, on account of the level of

underground water, the ground is always damp about 2 to 3 feet below the surface. The dry layer above this is of a sandy nature. Some of this land has had glass-houses built over it, and the Amaryllids planted in the ground. Under this treatment they are never watered, and the trapped sunheat induces flowering to an extent which no other method of cultivation has achieved. But such conditions cannot well be imitated elsewhere. We can, however, do something to simplify and improve our methods of cultivation under glass by raising a bed about 2 to 3 feet high on walls in any unshaded glass structure from which frost can be just excluded, leaving the coping of these low walls projecting a few inches above the surface of the bed, and supplying efficient drainage and a sandy surface to the bed. Bulbs of such genera as Amaryllis, Brunsvigia, Lycoris, Nerine, etc., planted in such beds, with a minimum of labour, flower with a frequency and vigour which cannot be approached by similar plants grown in pots.

Relative Hardiness.—Herbert said that his *Amaryllis blanda*—which was undoubtedly a Brunsdonna—was more tender than Amaryllis, and that if once cut by frost its injured leaves would not continue to push themselves out from below as do those of *A. Belladonna*. There is no doubt about the relative tenderness of Brunsdonnas, yet I have found that their leaves will continue to grow after they have been blackened by frost almost to the ground level.

Brunsvigia Parkeri alba is the most tender of them all, and the form *B. Parkeri Tubergeni* has the hardiest foliage: its leaves will actually recover *in toto* from being frozen through. But the experiment is like playing dice with providence. Some Nerines are hardy in situations which suit them. This is undoubtedly the case with *Nerine Bowdeni*, and I can recommend the free-flowering *N. flexuosa alba* as hardy in similar places.

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IMPRESSIONS OF SEED-GROWING IN CALIFORNIA.

By DAVID C. CUTHBERTSON, M.C.

[Read September 23, 1931; Mr. L. SUTTON, C.B.E., F.L S., in the Chair.]

ANYONE directly interested in seed-growing, visiting California for the first time, must be amazed at the gigantic proportions on which this industry is carried on. This, at any rate, must be the first impression: later on, as one becomes more accustomed to the enormous acreages, a realization of the thoroughness with which things are done probably takes precedence in the mind.

I was fortunate in landing at San Francisco early in May, and was able to stay on through the summer, till the Asters were in full bloom during September, and till the Lettuce, Onion, Sweet Pea, Leek, Beet and many other crops had been cut, harvested and threshed.

Looking back after a year, I can only say that my experience was one that I shall never forget, and my admiration for all I saw is as great to-day as ever.

In the short time at my disposal I think it will be better for me to tell you something of the crops and methods of several of the world-renowned firms I visited, rather than merely to talk about seed-growing in general. I will then show you some fifty lantern slides, which will perhaps convey more clearly to you than words what is going on in that great State.

Landing in May, as I did, I was fortunate in seeing the Early Flowering Sweet Peas. These are grown in great quantities and are as popular as the late types with which we are familiar here. All, or nearly all the early varieties are now of Spencer form and are very beautiful. There is just as much enthusiasm to get new varieties in this type as the others. Most of the crops I saw were growing at Lompoc, Guadalupe, or in the Salinas Valley (fig. 11).

Our own country not being interested in Early Flowering Sweet Peas, let me pass at once to Lettuce, the season for cutting this being then at its height.

The Lettuce crop for market is often talked about as the "green gold of California," and little wonder, for each year something like one thousand million heads leave California to be distributed all over America. The handling of the Lettuce is wonderful in the extreme. During May and October the peak of the shipping is reached, and from the Salinas area anything up to two hundred and fifty car loads may be despatched in a day. Each refrigerator car holds some three hundred and twenty crates, and each crate some fifty to sixty heads of Lettuce, all packed in crushed ice. The trains, completely made up of these cars of Lettuce, cross the continent in exceptionally short

time. The variety used is principally of the ' New York ' type, known perhaps better here as ' Wonderful.'

I have given you this short description of the marketing of Lettuce heads to emphasize the enormous importance of the growing of the seed crop. As recently as 1928 eighty thousand acres of ' New York ' Lettuce were grown on the Pacific Coast. Allowing two pounds of seed to the acre, it is a simple calculation to note that one hundred and sixty thousand pounds of this one variety are required annually—over seventy tons. I do not wish to tire you with figures, but it is an interesting speculation on the number of seeds there are in seventy tons when I tell you that there are approximately sixteen thousand in one ounce.

For a seed crop sowing is carried out in March in rows about 2 feet apart. The plants are thinned to about 8 inches apart when in the fourth leaf. Rogueing is carried out rigorously, and when the heads come to maturity they are cut open to allow the seed stalk to run up. When the seed has reached a fit state for harvesting the crop is carefully cut and placed on sledges ; these sledge loads are taken to a large area in the field where the ground is covered with canvas sheeting. The crop is allowed to dry on these sheets for a short time and then rolled out. The straw is raked off and the rough mixture of seed and chaff is put into large sacks. The threshing mill is drawn up alongside, and this produces a fairly clean sample of seed, which is then taken to the warehouse for final cleaning. The secret of growing good crops of Lettuce lies principally in the careful selection of the seed, and the amount of work expended on this is enormous. Last year the Ferry-Morse Company picked, for single plant selection, many thousand heads. A small quantity of each plant will be saved and tested out, and so the incessant work of constantly endeavouring to improve strains goes on. A great deal of work is being done in the establishing of disease-resistant strains, and in this work Doctor IVAN C. JAGGER, one of the plant pathological experts employed by the United States Department of Agriculture, has done a great deal.

Another interesting crop is Beet. The huge acreages devoted to this in the Sacramento Valley give some indication of the popularity of this vegetable. One firm I visited require one hundred and sixty thousand pounds of one variety, ' Detroit Red,' each year.

The amount of care expended on the improvement of type and colour was a revelation to me, and I was fortunate in being at Salinas when the Ferry-Morse Company were lifting their Beet trials. They had six hundred plots and the trials took us three days to lift, cut and note. Being present all the time I can speak with authority. Out of the whole six hundred lots I did not see a bad sample. This I know is an astonishing statement to make regarding Beetroot, but I can assure you that it is true. It was most interesting to note with what care Beet seed is cleaned. Samples are continually being drawn and tested with a view to ensuring no light seed is passing through the mill. Forty or fifty seeds will be placed on a stone slab and then each



FIG. 13.—MESSRS. WALTER FRANKLIN'S SEED RANCH, ARROYO GRANDE VALLEY, CALIFORNIA

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Fig. 14.—Seed Breeding Station, Messrs. Fetty Morse, Salinas, California.



FIG. 15.—ZINNIAS GROWING FOR SEED (MESSRS. BODGER'S FARM, CALIFORNIA)
(p. 1)



FIG. 10.—FIELD OF GROWING CROP OF SEED SWEET POTATOES ON RIVER RANCH, MESSRS. JERRY MORSE



Fig. 17. Threshing Radish, California (Messrs. Ferry Morse's Ranch)



FIG. 15.—SPREADING ONION SEED TO DRY ON CANVAS SHEETS AFTER WASHING (MESSRS. PERRY MORSE)

To face p 17

struck with a hammer to make sure that the kernel is sound. If some are found to be empty the mill is immediately adjusted. Germination tests are also carried out in steam-heated cabinets. These tests are continued all the time cleaning is going on and provide a further check on the final sample.

Other crops of great interest to me were Carrot, Leek, Onion and Celery. Most of these I saw in the Sacramento Valley, which is about a hundred miles north of San Francisco. Magnificent river boats do the journey from San Francisco by night to Sacramento, the capital of California; it is then but a short distance to the famous seed-growing districts. The value of the Sacramento River to the seed-growing industry of California must be beyond calculation. In this area the river has formed a huge delta, and many of the seed ranches are in themselves small islands. Motoring along the side of the river, often along artificially constructed banks, the scene on either side is intensely interesting and ever changing, but it is agriculture or horticulture all the time. There are hundreds of thousands of acres here and the variety of crops grown in this huge fertile plain is legion—Pears, Plums, Apricots, Peaches, and Cherries being a few of the fruits, whilst vegetable and cereal crops are too numerous to name. Irrigation, of course, is carried on everywhere, hence the value of the Sacramento River. Some of the new electric pumps, which the big ranches are installing, will each pump out of the river anything up to five thousand gallons a minute.

Twenty miles out of Sacramento one really reaches the intensive seed-growing districts. Here field after field of Lettuce, Leeks (fig. 16), Onions, Carrots (fig. 12), Beetroot, Parsnips, Celery, etc., may be seen. The size of the fields is beyond conception. Just imagine one hundred and forty acres of one variety of Radish. Where all the Radish goes to I do not know—one hundred and forty acres of one variety required by one firm in one year! and there are five thousand Radish seeds to the ounce. This was on one of the FERRY-MORSE seed ranches, and, whilst marvelling at the acreages, one must remember the other end; by that I mean the retail selling end; in other words, their commission box trade. This, of course, is worked entirely separately from their wholesale business. Headquarters at Detroit handle a wonderfully complete range of flower and vegetable seeds; they annually distribute more than one hundred million packets. But I am digressing a bit from seed growing.

I visited the Sacramento area on several occasions; each time the trip became increasingly interesting and also, I might add, increasingly hot! My last journey was returning from Echo Lake, about 8,000 feet up in the Sierra Mountains, *via* Placeville and Sacramento City. There was absolutely no wind; it was about one hundred and three in the shade. Acres and acres of Onion and Leek heads were lying out on sheets and drying under the most perfect conditions. Everywhere the rolling out of the various seed crops which were ready was going on—Beet, Radish, Lettuce, etc. Considering the difficulties of harvesting,

drying and threshing that we have here in the old country, one became very envious of these ideal conditions (figs. 17, 18). One firm alone has sufficient canvas sheeting to cover about one hundred acres. Although there is much more I would like to say about this part of California, time does not permit, and I must take you now to the Salinas Valley, two hundred miles south.

Here, and round about, a great many of the Sweet Peas are grown, and, as I said earlier, it is also one of the most important areas for growing Lettuce. Interested in Sweet Peas as I am, I must admit that, as I drove through mile upon mile of Sweet Pea fields, the feeling I had was just one of amazement. My brother and I drove out to one of the ranches at Watsonville and went right into the centre of a huge block of different varieties of Sweet Peas. I stood on the top of his car with my moving-picture camera; facing north, I started the machine going, and gradually turning round towards the east, then south, then west, and eventually back to my original position, I stopped the machine, turned to my brother, and said, "Frank, what area have I covered?" He replied, "Just over two hundred acres." The varieties were all of the best-known standard sorts, and without a wrong one to be seen. The growth was very strong, and in some cases a little too strong, but fortunately with no signs of the dreaded aphis. This district used to be famous for certain fruits, but seed-growing now seems to be the order of the day.

Motoring home in the evening the scene was a kaleidoscope. We pulled up at one ranch and again walked through a hundred or more acres of Sweet Peas. After a long walk we arrived at one of the most amazing sights I had yet seen in California—seventy-five acres of Nasturtium in full blaze of colour.

The seed-breeding headquarters of the FERRY-MORSE Company are situated just on the outskirts of the town of Salinas (fig. 14). This station is a revelation. Any of you who might be inclined to think that these great establishments are more concerned with quantity than quality would have your views sharply altered after a few hours in Salinas. I question if such intensive yet patient, scientific yet practical, work on such a scale, and achieving such results, is going on anywhere else in the world.

At San Juan, inland over the hills from Salinas, this concern has another ranch of a thousand acres. Here most of the final seed-cleaning is done. Lettuce seed is grown in great quantities, and it is most interesting to observe the huge acreages devoted to the growing of Garlic. Great tracts of land are also planted up here with Prune and Peach orchards.

Working still south, the next great area for seed-growing is at Guadalupe and Lompoc. Guadalupe is the home of the WALLER-FRANKLIN firm (fig. 13). They have some ten or a dozen different ranches. Here we find nothing but flower seeds. I visited the ranches on two or three occasions, and what a sight! their trial ground being as perfect as it is possible to imagine. On the ranches one sees huge blocks,

acres and acres in extent, of Helichrysums, Kochia, Verbenas, Stocks, Nasturtiums, Calendulas (just imagine a ten-acre field of Calendula, 'Orange King'!), Antirrhinums, and, in fact, almost every known popular flower for the garden. Unfortunately, the Antirrhinum crop was very badly affected with rust; in fact, as a garden plant it does not seem suited to California on account of this trouble. In this district neither Verbenas nor Asters were successful last year, but, considering the enormous variety, it is really wonderful that there are so few failures. Water here is beginning to cause some concern; it is mostly being pumped from wells, and the depth of these wells is lowering considerably.

From Guadalupe, through the pretty little town of Santa Maria and over the hill, makes a wonderful run to Lompoc. Prominent here is the great flower seed ranch of JOHN BODGER and Sons. I visited this ranch first in June, and then it was a glorious sight: hundreds upon hundreds of acres, and almost every well-known garden flower in full bloom—Sweet Peas, Larkspurs, Calendulas, Nasturtiums, Scabious, Verbenas, Poppies, Salpiglossis, Petunias, Nemesias, Helichrysums, Hollyhocks, Kochia, Eschscholtzia, etc., etc. All the various blocks of flower seeds are separated by lines of tall Larkspurs. It was here that I was so greatly taken with the new double semi-dwarf Nasturtium 'Golden Gleam,' a plant, I am certain, with an assured future.

BURPEE, of Philadelphia, have here a big ranch where Sweet Peas figure largely.

ZVOLANEK, the well-known introducer of the Early Flowering Sweet Peas, also carries on in the Lompoc Valley.

And now right south to Los Angeles, or rather El Monte, for a word or two about the famous BODGER Zinnias. Here are hundreds of acres of these growing, a riot of colour, and an indescribable scene (fig. 15). The land must be very valuable, as there is a natural form of underground irrigation. There is a very limited amount of land, because, apart from the patches of colour from the Zinnias and other crops, almost as far as the eye can see, there is nothing but oil derricks.

In this district I inspected some two hundred acres of Asters, and this was indeed an eye-opener. The Aster is giving the Californian seed-grower a great deal of trouble, as it is so subject to wilt, and in many instances last year growers lost huge acreages, and, in fact, much of the land is so bad that it is impossible to sow Asters at all. A very great deal of work is being done to try to evolve resistant varieties. So also with Zinnias, a great deal of work is being done to perfect the Dahlia-flowered type, and to evolve new types altogether. I was immensely impressed with some little Zinnias very closely resembling Pompon Dahlias.

These remarks I hope may have conveyed to you some slight impression of seed-growing in California. I hope the slides will increase that impression to a realization that the Californian seed-growers are a very live body, constantly seeking after new things, but who are, nevertheless, most carefully growing and supplying what their

world-wide public demands. To those who do not know, it must not be considered that California is one huge garden devoted to fruit-growing and seed-growing. The exceedingly slight rainfall makes irrigation inevitable. Irrigation can only be carried out on a flat surface, consequently any of the land that is of an undulating or hilly nature is quite unsuited for agriculture and horticulture. One runs for hours in a train or car through land which is almost desert. Whilst in California my outstanding impression was, that here is located the greatest seed-growing industry one could imagine.

The men at the heads of the various great establishments are big men—generous to a fault, and ever eager to learn all they can from anyone of experience who visits them. Nothing is too much trouble and no distance too great to travel if, at the end, the ideal after which all seed-growers are striving, is brought one stage nearer to realization.

GREENLAND'S FLOWERY VALLEYS.

By Miss I. W. Hutchison.

[Read March 10, 1931; Dr. A. B. Rendle in the Chair.]

My claim to speak about my two recent visits to Greenland is an unpretentious one. I was not there as a member of any scientific expedition or exploring party. I went up just as what one might call a "privateer" botanist, on my own account, first to the east coast and South Greenland for five months in 1927, and then to North-West Greenland for a year from September 1928 to September 1929. During the time I was in the far North-West I was able to collect seeds of the alpine plants of Greenland, and a good many of them have germinated at Wisley in the gardens of the Royal Horticultural Society and elsewhere. Some of the members of the Society were interested in these seeds and asked me to collect them on my second visit to Greenland; that is why I am to speak to you to-day, to tell you a little about those flowers.

We do not usually associate the thought of wild flowers or of horticulture with Greenland, which is a great island-continent—the largest island in the world—and its interior is a huge sheet of ice which has scarcely ever been trodden by the foot of man. Nevertheless, there are, all round the coast, beautiful green fjords, and there is a flora of about 390 different species.

Greenland is a land whose topmost point contains the most northerly vegetation in the world. Across the frozen sea, over the narrow channels between Arctic North America and Greenland, thousands of years ago, one of the oldest Eskimo tribes—the Tunit—migrated into Greenland. It was across these narrow channels (Smith Sound and others) that many of the seeds also migrated, because most of the plants are American species. There are about 74 European species found on the east coast (though only 9 are not found on the west coast also), but 134 American species in West Greenland are not found in East Greenland.

The Eskimo people came over these channels, migrated down by the south, and penetrated up the east coast. They are now all Protestants baptized into the Lutheran church of Denmark, and are a very friendly, kindly race.

On account of the natives the land is a "closed" shore, and it belongs to Denmark, who have the monopoly of all trade. There are only about 35,000 Eskimos left in the world and about 15,000 of these are in Greenland. It is in order to protect this extraordinarily simple, friendly race from too sudden contact with the dangers of civilization that the land must remain closed, and I think it is a very wise

provision. I hope the Danish flag will long keep guard over these beautiful crystal shores. The Danes are good to the people, and under the Danish monopoly they are very slowly increasing.

Our first visit is to the east coast, to Angmagsalik, and after that we are going round the most southerly point—Cape Farewell—to Julianehaab. This southern district is often called "The Garden of Greenland" because there you get the majority of the species of flowers.

My next visit was made to Umanak, a tiny island off the far north-west coast, and in this region I spent a year. The houses have no gardens (unless one excepts the natural vegetation which sometimes springs on the earth roofs and window-ledges and is occasionally quite handsome in summer!). The natives also grow pot-plants indoors occasionally.

Greenland is often compared to fairyland, and I do not think there can be any other country in the world that so much corresponds to the Celtic idea of the beautiful Green Isle that lies away to the west beyond the sunset, "Where there is no sin, no discord, naught but sweet song to be heard," and which is full of fair, springing flowers. The Greenland summer is a very short one, only about three months, but in that time there is a wonderful variety of blossom. The flowers come out about June with almost explosive suddenness, and live and flourish and set seed within about three months.

The late Professor OSTENFELD, of Copenhagen Botanic Museum, has done a great deal to make the flora of Greenland known in Denmark and Europe. He and Magister PORSILD, of the Danish Arctic Station on Disko Island in West Greenland, are Greenland's most famous botanists of the present day.

We set sail at the end of July 1927 in the *Gertrud Rask*, 500 tons, specially built of wood for the ice. The east coast of Greenland is much more difficult of access than the west. It is constantly blocked by a stream of polar ice, and if one goes up in August it is impossible to return except by the same ship till the next August. If you miss the annual boat you have to wait a whole year to get back again!

After we set sail we saw no land until we reached Greenland, with the exception of the lonely Fair Isle between Orkney and Shetland. I was the only Briton on board. There were three women, and my cabin mate was a little Greenland woman who was going up to be a nurse at this lonely station, after having trained for fifteen months in Copenhagen.

On the tenth day we got our first sight of the ice. Bitter fog surrounded us, we had to go dead-slow all night through the ice pack waiting for the first sight of the little "kayak" containing an elfin pilot, a Greenlander who comes an amazing distance through the ice and fog in his frail craft to bring in the ship. He gets five kroner (a krone is about 1*s.* 2*d.*) for his trouble. He is hoisted (so much is he part and parcel of his boat) on to the deck in his craft, and he skilfully pilots the big ship towards the beautiful land of sunshine that—as the

wireless operator has already foretold us—is waiting for us behind the mist.

The coast is a shore closed by nature as well as by man, for nearly all the country is covered with the inland ice. Angmagsalik is the most remote of all the Danish colonies (with the exception of the new colony of Scoresby Sound, farther north on the east coast). It was not discovered by Europeans till 1884, so that the Angmagsalik natives are the most primitive of all the Greenland natives.

We were greeted first of all by the howling of the dogs on the shore, and as we drew in I saw that the cliffs were covered with the beautiful "Scottish" harebell or bluebell, and patches of white Cerastium. It seemed quite a garden and unlike my preconceived notions of Greenland. The women, in their brilliant national costume, were just like flowers too. It may interest some of you to know that Angmagsalik is the spot where Mr. WATKINS' expedition of young Englishmen intends to winter in 1930–31, looking for a possible landing-place for aeroplanes on the inland ice, for a proposed British air-route to Canada.

As we came in we saw a beautiful mountain-coast girdled by the mist, and a flotilla of little kayaks coming out to escort us in.

We were only at Angmagsalik four days, for the ship had to leave hurriedly on account of a drift of ice coming down from the north. The captain was afraid he might be shut in for a long time if he lingered. But I had time to explore the little stream that runs down the valley, and there I got a number of alpine flowers that I met for the first time.

In this little valley I did my first botanizing. There are some salmon-trout in the stream, and the ground is covered with the Ground-willow (fig. 23). There is no Heather in Greenland, but the Ground-willow and alpine plants of various sorts take its place. Among other plants here we found *Epilobium latifolium* and *Cassiope hypnoides*. The Ground-willow ("pil-krat") never grows to any great height, but it sometimes reaches an age of fifty, sixty, or even eighty years, though the branches are never thick in circumference, as it takes so long to grow.

In the rocks grew one or two ferns, and one of the loveliest of the Greenland flowers, *Ranunculus glacialis*. It is a European species and I am told grows in the Alps also. It is one of the few species in Greenland that is sweet-scented. There are not many scented flowers in Greenland, but this one has a very sweet little smell, and it was growing in quantities amid the rocks and stones. I thought I would find it again in West Greenland and did not take any. When I got to West Greenland I was very much disappointed because I never came across it again. It is peculiar to East Greenland. It is also interesting because it is a sunflower, and turns its face to whatever direction the sun is in the sky.

Epilobium latifolium is a very handsome species, but I am sorry I could not procure a good photograph. It is the largest and handsomest species of Greenland's wild flowers. It is purple, like our own Epilobium, and grows for preference in the shingly beds of streams.

The natives call it " Niviarsiak "—the " Maiden "—perhaps because it grows in this solitary position.

Cerastium alpinum (fig. 19), which we get also in Britain, grows in masses all over the rocks of Greenland.

Ranunculus sulphureus (very like *R. nivalis*) seen there is also found in East Greenland. It has a bright golden flower. Here also grows the little *Woodsia glabella*, one of Greenland's ferns. There are a fair number of ferns in Greenland, and perhaps the most common is *Cystopteris fragilis*. *Saxifraga nivalis* also grows there in quantities.

Dryas integrifolia (fig. 22), with beautiful creamy-white flowers, stars the hillsides in early summer.

Sedum Rhodiola, a little Sedum which we get in the mountains of Scotland, also occurs. It is very common in Greenland. The leaves turn very bright red in autumn.

There is a wireless station at Angmagsalik, erected in 1925, over which messages will doubtless be reaching Mr. WATKINS and his friends from England this year. Daventry can be heard quite well from this wireless station. The mountains around were covered with dwarf alpines, the little *Azalea procumbens* and the *Cassiope hypnoides*, as well as the *Ranunculus glacialis*, being amongst the most beautiful which I saw there.

We left Angmagsalik on a beautiful evening, with the sun setting amidst the icebergs; I have never seen a lovelier sight. The colouring of the bergs is wonderful; those great flowers of ice floating around the coast are one of the most remarkable features of Greenland. They take all manner of shapes—knights, castles, birds, and strange animals. Then sometimes there comes a sudden roar, as of artillery, and a giant berg crashes in pieces. They are, however, dangerous things to come across in a ship, and the captain of *Gertrud Rask* was glad to slip out from amongst them.

I must tell you that the Englishman in Greenland goes by a very curious name. He is always called " Tuluk." I was known to the Greenlanders as " Tuluk " (Britisher). It is said to come from an Eskimo word meaning a biscuit, " Tulussaq," because the large ship's biscuit was first introduced to the Greenlanders by the British whalers. They had never known it till we went up there, so they always associate us with biscuits. They are certainly very fond of biscuits. A little boy, " Ole," was our only passenger from Angmagsalik for West Greenland. He was going to be a parson and he had to study for five years at a seminary at Godthaab in West Greenland. I had purchased in Copenhagen a large tin of chocolate biscuits, and thinking that Ole might like some I went to his cabin to offer him a few. I did not know any Greenlandic and Ole did not know any English, so I said in my best Danish, as I held out the tin, " Please help yourself." And Ole with a delighted smile accepted very literally by helping himself to all the tin!

Now we come round to South Greenland, " The Garden of Greenland," as it is sometimes called, where I spent the autumn of 1927 exploring the very little known fjords at the back of Cape Farewell.



FIG. 19. CERASTIUM ARCTICUM L. GRELNLAND



FIG. 20. ERIOPHORUM SCHEUCHZERI N. GRELNLAND

To face p. 24



FIG. 21. UMANAK MOUNTAIN, N. GREENL



FIG. 22. DRYAS INTEGRIFOLIA N. GREENLAND.



Fig. 3.—Saux glacier, Greenland



FIG. 24. UMANAK MOUNTAIN FROM THE LAKE



FIG. 25. TYPICAL VEGETATION ROUND A STONE'S GREENLAND



FIG. 26. ANGELICA SYLVESTRIS
(Greenland's tallest herb)



MATRICARIA INODORA VAR. GRANDIFLORA ON RUINS OF GARDAR CATHEDRAL, S. GREENLAND (introduced).



Ic[illegible]s Erigeron and Draba in Greenland

Europeans very rarely visit this region, but the Danish manager and the Doctor at Julianehaab were going their annual rounds in their motor-boat and very kindly let me go with them, so I was fortunate in being able to visit some of these remote regions. Most of the fjords are closed with the " dead hand " of the inland ice, and it is often very difficult and dangerous to get on to this ice.

I collected at the foot of the ice some of the loveliest Saxifrages (*S. oppositifolia*) with immense flowers, larger than usually found in Britain. It is from the inland ice that the icebergs are formed. As the ice gets gradually pushed out to the coast and meets the sea it breaks away, and the bergs float down into the neighbourhood of the ships. One Greenland ice-brae near Jakobshavn alone sends such a vast quantity of ice down that according to Professor SEWARD it has been estimated that it would make a mountain 2 miles long, 2 miles broad and 1,000 feet high every year !

We found the beautiful *Mertensia maritima* growing on the sand at Sermersok. The Danish Arctic station on Disko Island has not yet, I believe, recorded it so far south. It was found by the Danish manager of Nanortalik, Mr. MATHIESEN.

At Nanortalik I was able to hire a woman's boat or " umiak " of sealskin. The umiak used to be rowed only by women, so was called the " woman's boat." The men, of course, use the " kayak." Now men as well as women often row the umiak, and I had several in my party. We explored the longest fjord in the south of Greenland, the Tasermuit Fjord. It is perhaps the most beautiful of all the Greenland fjords, and near it grow the only trees in Greenland. These are birch of about 20 feet high. The rowan tree is also found, though rarely. The Greenlanders were very much pleased when I told them the Celtic superstition that the rowan keeps away witches. That is, of course, why it is so frequently seen by the lych-gates of English churches. The bright berries were supposed to frighten away the powers of darkness.

Tasermuit is one of the places where the first Norse colonists of Greenland landed in the tenth century, and there are some of their ruins about the fjord. I met an old woman at Nanortalik who had " second sight." She told me that as a young girl she was playing one day on the shores of Tasermuit not far from her mother's tent, when some " very tall men " came up to her and asked her if she would come away with them, " for where we are there are many of us." A strange story for a little Eskimo child who had never heard of the tall Norse Vikings ! Curiously enough, that little child, now an old woman of eighty, was of Norse descent. Back in her ancestry she had a Norse forefather.

The tallest trees—in fact the only trees—in Greenland, grow in Kinguadal, half-way up the beautiful fjord of Tasermuit, beyond a lake. We had to carry the umiak over the rapids of a salmon-river (full of prime salmon) to reach the lake. After we had rowed down it we went up about a couple of miles until we came at the heart of a dale to the " wood."

The mosquitos in Greenland are in some places—such as this—literally the only "fly in the ointment." They are sometimes very troublesome, though they did not annoy me very much at any time. Their worst period is perhaps about the middle of July.

There are no native fruits save the "blaeberry," the crowberry and occasionally the cranberry. The crowberry grows in great quantities; in fact, if Greenland were near to Europe I am sure the natives could carry on quite an industry canning that fruit.

We were remarkably lucky on this occasion, because we met on this Greenland fjord the famous explorer, Dr. RASMUSSEN, who was on his way to St. Andrews in Scotland to take his degree of Doctor of Philosophy, for the wonderful work he did exploring Arctic America and Greenland, where he has crossed the inland ice several times. He was very much interested to hear that there was a "Tuluk" on the fjord, and he stopped his motor-boat and sent us on board some tinned apples. We had to share them all out so that everyone in the umiak got a portion.

Dr. RASMUSSEN has collected much of the Eskimo folk-lore. Greenlanders, by the way, do not like to be called "Eskimos," they style themselves "Greenlanders" (though they are, of course, of Eskimo race, they are now very much mixed with Danish blood). These Eskimo folk tales are of amazing interest, and Dr. RASMUSSEN has also collected some remarkable little songs and poems, for he speaks Greenlandic as a native, his mother being a Greenlander. As he had just lost his English translator when I met him, he asked me if I would translate some of these songs and tales for him, which I have just finished this winter. You may like to hear the song of an Eskimo "botanist" (I think I may call the author a "botanist," for she is gathering the Willow, and sings of it). She says:

I am but a little woman,
Who eagerly will toil,
Who eagerly with joy
Will toil and moil—
And in my glad ardour—
Longing just to be useful—
I pluck the willow-catkins
That put me in mind of
The big wolf's beard.

I am fond of going
Far—far out,
My soles become outworn
Whilst I pluck the willow,
Willow with catkins,
Which put me in mind of
The big wolf's beard—
The big wolf's beard.

Now this "Willow with catkins" that she was looking for does not grow very high, but the Willow catkins cover the ground and almost look like bog-cotton (fig. 20) when they are dispersing their seed (fig. 23). The Willow grows very often in an espalier form; the

ground is so hard and frozen that it cannot sink its roots very deeply, so it spreads out like an espalier all over the rocks.

Angelica sylvestris is the tallest herb in Greenland (fig. 26). The natives use it as a vegetable and are very fond indeed of it. In fact it is in danger of being exterminated, but it is still found in quantities in the remoter glades. The Danes preserve the stem in vinegar, and it tastes remarkably well. The natives call it " Kvan."

A typical Eskimo dwelling or "igdlo" is made of stones, lighted by big glass windows which are imported from Copenhagen. The natives have not usually enough money to buy two window-sashes, so they do not always have double windows and the houses are sometimes apt to be chilly, but as a rule they have now good modern stoves and are quite warm and comfortable. If they cannot afford coal they burn the green ling from the hills (*Cassiope tetragona*, crowberry and willow-scrub). They have a remarkable knack of being able to light it quite green. My maid in North Greenland could always light a fire with green ling, but how she did it I do not know.

At Ikigait, one of the places which the Norsemen first colonized in Greenland, in the old churchyard some very interesting discoveries have recently been made of the Norse and Viking remains, the only ones of this kind that exist and which were excavated by Dr. POUL NORLUND of Copenhagen. In this churchyard he has unearthed coffins made of deal and spruce, and even one which was made of juniper wood from the native hillside, though juniper in Greenland does not now grow to any great size, not large enough to make coffins, as in those days this one at least must have done.

I must mention a word or two of history here to make you understand the importance of this find. The country was first colonized by Erik the Red, an Icelandic outlaw, about the year 985. He sailed away west from Iceland and landed in Greenland. He gave the name Greenland to the country as a sort of advertisement, because he said, " If the country has a fine name it will attract men thither." Sure enough it did, and his fellow-countrymen came from Iceland and Norway and founded civilization in Greenland, where this Norse colonization lasted for nearly five hundred years, when it died out, the Norsemen being overcome by the " Skraellings " or Eskimos, and the difficulties of the Arctic climate. The Norsemen built monasteries and farms, they also brought cattle with them from Iceland, and in the cattle fodder were accidentally imported about fifty species of European flowers, which are now a very beautiful living monument to the Norsemen. Besides the flowers they have left these graves and the ruins of their buildings excavated by Dr. NORLUND. In the Museum at Copenhagen are the garments in which the dead were wrapped, and the wooden crosses made by the Norse Christians inscribed with praise of God. To botanists perhaps the most interesting find in one of these coffins was the berry of a bilberry (*Vaccinium*) preserved in the frozen soil and almost fresh-looking. I wondered

when I read of this whether Dr. NORLUND had thought of sowing this berry, and if he had, whether it would germinate! I have had letters lately from Dr. KINZEL of Munich, telling me of the germination of seeds after eight or nine years under the action of frost and light. Dr. NORLUND also found the roots of plants growing through the coffin lids, which showed that the level of the ground had changed and was now lower than the level at which it had formerly thawed.

The most beautiful of the Norse relics is the scentless Mayweed (*Matricaria inodora* var. *grandiflora*). It covers the ruins of the old cathedral of Gardar near Igaliko (fig. 27).

Although this southern district is called the Garden of Greenland, almost the only horticulture that exists is at the farm-station at Julianehaab. Here the Danish manager, Mr. LINDEMANN WALSOE, has grown greens, radishes and potatos, and also a few flowers, of which the marigold flourishes perhaps best. He had some nice pot-plants indoors. Though the Greenlanders do not have gardens, it is wonderful what they can do with pot-plants.

The seal is practically extinct in South Greenland, so the Danes are trying to replace seal-hunting by sheep-breeding. They have imported sheep from Iceland. They had about 3,000 ewes in 1927 in South Greenland and these were doing exceedingly well. Of course the difficulty is feeding them in winter. For winter fodder the ground-willow is cut when it is young and tender, the shoots are dried and the sheep are fed in winter on this dried ground-willow, because of course there are practically no hay-meadows in Greenland. The sheep also eat in winter the small fish (capelan) that is taken at Julianehaab and elsewhere, and I must say that the mutton of Greenland tastes very well indeed.

I got home about Christmas Day in 1927, and it was owing to an article which I had written about the farm in Greenland, which was published in *The Field*, that Mr. MILLARD of East Grinstead wrote and asked me if I were returning, and could collect seeds for Wisley and various Fellows of the Royal Horticultural Society. This I was much pleased to do, because I had received permission to return and spend the winter at Umanak, about 71° North. The island is formed of some of the oldest rocks (geologically) in the world, the Archean rocks. Greenland mostly consists of this very ancient rock, and the fossils that have been found in certain other regions of fossiliferous strata there, show that Greenland was at one time a tropical country. I believe you had a lecture about ten years ago from Professor SEWARD of Cambridge (JOURNAL, R.H.S., **50**, p. 1), and he has lately sent me some very interesting papers about these remarkable plant fossils which he has found in Greenland. I would like to read you his description of Greenland as it was in past aeons.

" It is possible with the help of a little imagination to reconstruct a scene in Cretaceous Greenland. Across a broad estuary in summer, a range of mountains on which patches of winter snow are still unmelted; in the foreground maidenhair trees, conifers, foreshadowed by pines,

cypresses, araucarias, and other surviving members of the Gymnosperms. There are very many ferns, a few with erect stems, with creeping rhizomes bearing long-stalked and bushy fronds, others with leaves divided into long narrow arms. Among the broad-leaved trees are several planes, an oak, a magnolia in flower, trees with the foliage of dalbergias, the cinnamon, and trees belonging to families which since the Cretaceous period have wandered through Europe and the greater part of the North American continent, some surviving only in these southern tropics."

It seems to us indeed strange to think of Greenland as it was in those days.

On Umanak island I lived for nearly a year, and on this pear-shaped island at the mouth of the fjord called Ubekjendt Eiland (Unknown Island), a name given to it by the Dutch whalers of the seventeenth century, I spent a month in summer and collected about sixty species of alpine flowers. I was able to fill some 450 seed-envelopes, and I brought back fifty different varieties. I am glad to say various subscribers have been able to grow some twenty-three out of the fifty species; the majority have germinated at Wisley. I hope they may continue to grow. Of course it is easier sometimes to get seeds to germinate than to get them to keep on growing.

The island of Umanak is named from the "heart-shaped mountain" (fig. 21). The rocks were full of Saxifrages of several varieties; *Saxifraga groenlandica*, *S. cernua*, *S. oppositifolia*, and *S. nivalis* were the commonest. Here also grew one of the most beautiful alpines in North Greenland, *Rhododendron lapponicum*, which has germinated at Wisley.

Under the mountains there is a beautiful lake which froze in winter and afforded one of the Danes and myself a good deal of skating (fig. 24). The Greenlanders cannot skate, though in places less rocky than Umanak they are able to ski. They attempted a little skating at Umanak, but were not very well able to fasten their old skates (got from the Danes) on to their heelless "kamiker" (sealskin top-boots) which is the regular footwear amongst the Greenlanders. We had a good deal of sledging on this lake. Luckily for me the winter of 1928–29 was remarkably mild, a "heat-wave" for Greenland. As the thermometer was usually below zero I was glad it was not what they called a "cold-wave"! My house was heated by stoves and I could purchase coal from the store in the village. There is a store in every colony which is open for about an hour in the morning when the natives do their shopping.

Here was the little house in which I spent the winter in Umanak. We had "Big Island" opposite to us. Once I got on to it, but as the sea between us did not freeze strongly enough to sledge over, it was not easy to reach it before summer. I sowed on it and also on Umanak some British seeds of the scarlet Poppy, which is quite unknown in Greenland, and a few plants from our Scottish hedgerows. Perhaps some day a Danish botanist will get a surprise if the seeds

germinate! He will wonder how the scarlet Poppy came to Greenland and expound a new theory to account for it!

We were living in darkness for over two months in winter. About November we saw the light fading, and then in February the first rays of the sun came back again. The dawn and sunset were very beautiful in November. The sun tried to rise, and then, as if tired, seemed to melt back again into sunset, amid glorious colours. Then we were left to a long winter twilight—we were never really in the dark. There was magnificent moonlight, the moon seemed to go round the sky all night, and magnificent starlight, but lovelier than all, the Northern Lights. Some nights they were nearly as bright as day. On Christmas Eve we had a magnificent display of the Aurora Borealis. It was the most beautiful Christmas Eve one could see anywhere. The church choir had been practising carols for some weeks and sang their carols outside our windows at midnight very beautifully—the Greenlanders have magnificent voices as a rule—while overhead the Northern Lights fluttered out and in like the wings of the angels at Bethlehem on the first Christmas Eve.

At Ubekjendt Eiland cotton grass, *Erigeron*, *Honckenya peploides*, and *Draba incana* grow near the beach (fig. 28), and on bare shingle slopes grows *Pedicularis lanata*. The last is a very handsome plant which one might call the Greenland "orchis." It looked remarkably beautiful growing quite alone. *Dryas integrifolia* grew also on this island.

Just before returning home in 1929 I climbed the mountain of Kilertinguit. It had not been climbed for fifty years. I was told that the first person to make the ascent was a "Tuluk" named EDWARD WHYMPER. I thought that I would try to ascend it again to see if he had left any paper on the summit, or cairn. I got two guides to go with me (Greenlanders, EDWARD KRUSE, the organist at Umanak, and TOMAS, a hunter from Kaersuit under the mountain). We had to wait for about three days in a hut at the foot of the mountain, which TOMAS owned, for the mist to lift; at last, in the early morning of July 13, we set out. After a strenuous climb of about ten hours we reached the top in the light of the low midnight sun. We found many flowers on the lower slopes, but the highest flower of all was a solitary yellow Poppy growing under a coat of ice about the 5,000 foot level. (The height of the mountain is 6,250 feet.) On the summit was a little cairn of stones, and in the cairn a bottle, and in the bottle a paper bearing the names of the last climbers. I found that Mr. WHYMPER had been up still earlier than I thought, in 1873, and that the last men to climb the mountain had made the ascent in 1879, exactly fifty years before me. The latter climbers were a Danish geologist, K. J. V. STEENSTRUP, and three Greenland guides, whose names we found on a paper in the bottle. We added our names and date and replaced the paper. We also left on the top a little sixpenny Union Jack (purchased from Woolworth's in Edinburgh, and which had hung proudly over the window of my house in Umanak all the year) in the bottle

in memory of the Englishman WHYMPER, the first man to climb Kilertinguit.

After we had accomplished our climb we thought that the colony would probably entertain us to coffee to celebrate the event! When we returned to Umanak, however, we found that our feat had been eclipsed by two young Alpinists, Dr. GEORGI and Dr. SORGE, from Professor WEGENER's party, who had just reached, for the first time in its history, one of the terrible twin peaks of the dangerous Umanak mountain. Though the mountain is only about 4,000 feet high, it is much more difficult to climb than Kilertinguit, indeed the climbers told us that it was three times worse than the Matterhorn. When we reached the colony everybody was waiting in great trepidation to see if these climbers returned safely, which I am glad to say they did.

PLANT COLLECTING IN TASMANIA.

By H. F. COMBER.

[Read July 28, 1931; Sir A. W HILL, F R S., in the Chair.]

I AM afraid much of what follows is more a description of the plants which I found in Tasmania, than a lecture in the ordinary sense of the word. Many of these plants are familiar to you under well-known names, but possess characters quite at variance with general supposition. As they are likely to be a guide to their cultivation in years to come, I commend particularly to your notice the situations and the climates described.

The climate of the Island is very variable. All down the west coast there is a very heavy rainfall, averaging as much as 100 inches a year in Queenstown, where it has been recorded for several years. But, as scarcely anybody has done more than pass through very small areas in all the south-western territory, very little is known about it. Some of the roads have only been traversed once, and since then, probably about fifty years ago, they have become so overgrown that they are practically indistinguishable from the surrounding forest. Here one can find on the road itself giant Eucalyptus trees which measure several feet through the trunk.

A word or two about the history of botanical collections in Tasmania may be of interest.

Most of you know that Van Diemen's Land was discovered by ABEL TASMAN, a Dutchman, in 1642, but the first botanical collection was not made until 1777. The records of this are not very full, and the collection does not seem to have been a very important one. In 1792 a Frenchman, LA BILLARDIÈRE, under Captain D'ENTRECASTEAUX, landed in Recherche Bay on the south of the Island, and collected many plants. Practically all of them became the type specimens of their respective species. Later, 1803–1805, a very famous botanist, ROBERT BROWN, came with Captain FLINDERS to Hobart, and stayed in that small settlement. He collected an enormous number of plants, and as he was a first-class observer, and it was a very fruitful district, a great number of species of Tasmanian plants are found with the initials " R. Br." after them, signifying that they were named by him. One of his journeys was very interesting. He went from Hobart down to the River Huon, and in the record of the plants he collected along that route, we find exactly the same plants that one can see from the motor road now. Most of them are extremely local, and it is very interesting to go down that road and find them.

ROBERT BROWN'S work was perhaps the most important of all,

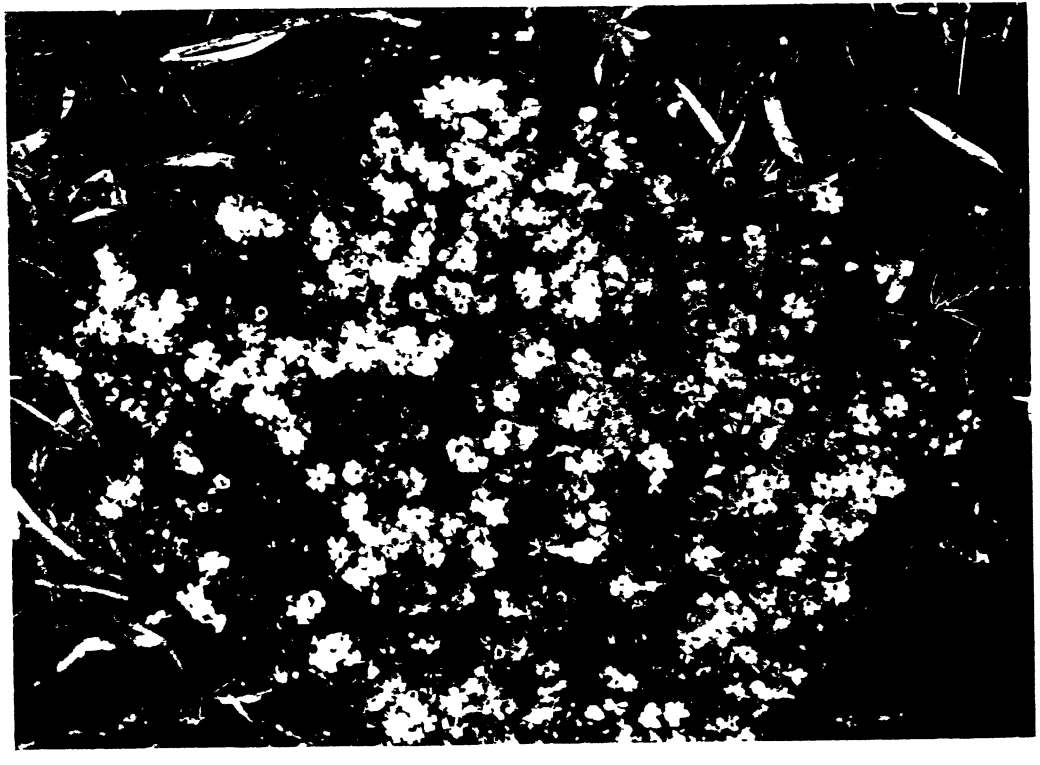


FIG. 29.—HIBBERTIA FASCICULATA
P. 31

[*To face p.* 32



FIG. 30 OLEARIA FLORIBUNDA
(p. 36)

since he was the first man to make a very extensive collection of Tasmanian plants.

Then we have ALLAN CUNNINGHAM in 1818, who came out into Macquarie Harbour, on the west coast, and collected on the surrounding mountains. This is a wet area, whereas from Hobart eastwards is comparatively dry. Because of that he gave us a great number of new species of mountain plants. The distance from the west to the east coast, as one has to go right round to the north and then down the east, is very great, and practically none of those plants were brought home alive. In 1831 we have a definite record of one CHARLES FRASER having collected plants and sending them home. I think that is the first record we have of any Tasmanian plants coming to England. Then, between the next year and 1850, ROBERT CAMPBELL GUNN, who was afterwards a police magistrate in Tasmania and had great influence over a large number of people, collected plants and inspired the collection of vast numbers of specimens. They were so splendidly selected and pressed that they are the best specimens of Tasmanian plants in existence at the present day. Incidentally, we have a great number of plants named *Gunnii*.

This laid the foundation of HOOKER'S "Flora of Tasmania," a work which is well worth reading by anyone who is interested in Tasmanian plants. Most of the new species of the day were illustrated in colour in that book, and many of the plants I have collected and sent home are to be found there, and are splendidly illustrated. In 1840 Sir JOSEPH HOOKER visited the Island, travelling in the centre and down a short distance to Port Arthur. Port Arthur is the old Penal Settlement, a very notorious place.

Later, several other botanists made smaller collections, some of them in the north, but apparently the north-west corner of the Island had not been botanically explored at that date. There is a small area on the west, round the original Penal Settlement at Macquarie Harbour, where men had worked and collected, and we find that one, MILLIGAN, climbed the western mountains and found a new floral group. So there, again, we have a number of mountain plants named *Milliganii* after him; also we find the collectors BACKHOUSE, LAWRENCE, STEWART, and PATERSON commemorated in the names of plants. Anyone wishing to refer to the Tasmanian flora at the present time must go to RODWAY'S book on the Flora of Tasmania. It is, I am sorry to say, already getting out of date, but it is by far the most useful and comprehensive book of all.

Since the old collectors' days, a considerable colony of settlers in correspondence with the Mother Country seem to have introduced many of the more showy shrubs from the Hobart district, and occasional notable survivals in our gardens stand out as Tasmanians and not mainland plants by reason of their comparative hardiness.

Prominent among these are *Eucalyptus Gunnii*, *E. coccifera*, *Ozothamnus Antennaria*, *Hakea acicularis* v. *lissosperma*, *Drimys aromatica* and *Podocarpus alpinus*, all from the mountains; but also we

have *Ozothamnus thyrsoideus*, commonly grown as *O. rosmarinifolius*, *Olearia Gunniana*, *Acacia dealbata*, *A. verticillata*, *Leptospermum pubescens*, *Olearia erubescens*, which, in our gardens, has usurped the name of *O. myrsinoides*, a much smaller species. Plants which have not grown so well outside are *Prostanthera lasianthos*, *P. rotundifolia*, *Correa* spp., *Epacris impressa* in many varieties, *Goodia lotifolia*, *Lomatia tinctoria*, and the superb *Anopterus glandulosa*, but their value has kept them in good places in our greenhouses.

With the exception of those first mentioned all occur at fairly low elevations, and so we are forced to the conclusion that the flora of the comparatively inaccessible mountains was not introduced to cultivation in anything like representative numbers, or if so, was lost by wrong cultivation.

Hence it is not really to be wondered at that most people have the idea that Tasmanian plants, as a whole, are tender, this idea having sprung from the knowledge that many lowland plants are tender. Tasmania has a mild climate in its lower portions, but it is extremely cold on the mountains.

We know a little more about Tasmanian plants in British gardens through the efforts of Mr. OVERALL, a clever nurseryman from the North of Tasmania. Within the last few years he has made excursions to various mountains in the north-west corner of the Island, and he went to Mount Zeehan and has sent home some very interesting plants. But he has had to carry them all on his back, as everybody has to who collects anywhere off the beaten track in Tasmania. Naturally we have very few of them, and it was partly because these plants had proved so hardy and so good for British gardens that the Tasmanian expedition was launched. A further hope was to get hardier varieties of Australian mainland plants, plants which we had already proved to be too tender for outside. The climate of the Hobart district is fairly dry, but rapidly becomes moister as one goes west. The temperature is lower as one goes south and into the mountain ranges. The eastern coast of the Island is rather warm, and contains many plants which have come from the mainland of Australia. Such species are able to survive there, but they cannot endure in other parts of the Island. Consequently I had to leave the East alone except for one short trip. As I had great facilities in many ways down south, I found it paid me better to work in that district. One notable excursion was made out to the wetter western areas; but as trade out there, which mostly consists of mining, is declining very rapidly, the vegetation is growing very thick, and exploration is practically impossible in most places. The middle part of Western Tasmania has only been traversed once or twice, and then only by men who have gone out carrying flour and bacon, these having been selected as being the most compact foods at their command. In Western Tasmania a man can carry enough food for a fortnight's requirements, provided that he is not burdened with any extra weight. The whole country is so densely covered with undergrowth and forest that he

cannot get far in that time, and as most growth there is of such a nature that horses and mules can find no sustenance from it, they are practically useless to the explorer. Therefore all the requirements for the expedition have to be carried on the men's backs. That fact practically excludes any further exploration of that type of country, unless it be for some well-financed project. Such a project has been in view in the south; a large paper pulp company has been exploring, and I was able to get on the fringe of their work. They had just ceased the week before I got there, and I could not get out with them, but thanks to the kindness of Mr. JOHN AVERY, the manager, I had a lot of help from them, and I was able to use some of their material.

Most of the plants from the drier parts of the country are extremely xerophytic. There are *Daviesia ulicina*, with masses of small pale yellow flowers, having darker centres; *Leucopogon virgatus*, with very pretty white-fringed flowers; *Pimelea spathulata*, about three feet high with cream-coloured flowers very frequently met with; *Goodenia lanata* with small yellow pansy-like flowers, fairly common, and creeping on the ground; *Lissanthe strigosa* like a dwarf pale pink Epacris, but with beautiful berries instead of the dry capsular fruits of that genus.

Stackhousia linarifolia is of a very interesting order; it is about 18 inches high, and its pale cream flowers last a long time. A plant which is grown in many English gardens is *Acacia verticillata*. It is common in Tasmania and in Victoria on the mainland of Australia. The mainland form is much softer in the foliage than that from Tasmania. You cannot take hold of the Tasmanian kind as it is too prickly. The flowers of both are practically the same. I have seen plants of this species grow and survive out of doors for several years, and now I know that it was always the Tasmanian form. I think that will be repeated in very many species, species which we have grown and discarded perhaps, just as with this mainland form of *Acacia verticillata*. Frequently there are two distinct varieties or species, one in Victoria on the mainland, and the other in Tasmania, and often the latter is much the hardier.

The 'Blue Love creeper' of Tasmania, *Comesperma volubile*, is best described as a climbing Polygala with bright blue flowers.

Tetratheca pilosa is a very beautiful plant with purple flowers, and very distinct black anthers. There are two other species equally showy.

Helichrysum scorpioides is common to all these drier lower regions, and forms a mat wherever there has been fire. It has already flowered in this country from seeds. The flowers are pale yellow, and brownish outside. It is growing very well out of doors, and I do not think it will cause anybody trouble.

Helichrysum dealbatum has large white flowers, and is found in similar situations.

Now we come to the very interesting genus Hibbertia. There are many species of Hibbertia, growing mostly in dry heaths in similar

places to Ashdown Forest, Hindhead, and Wisley. You can well picture the country and the poor soils which suit them. *Hibbertia acicularis* is rather prickly but *H. fasciculata* (fig. 29) is much freer flowering. Many seeds of these species were collected, but, so far, none of them have germinated. They are hard, firm seeds, which are not likely to decay rapidly, and I think it probable that if they are exposed to frosts in winter and brought into a frame in spring, a majority of them will come up. Some of the Tasmanian seeds which were sown in pots and exposed to last winter's frosts came up, while the control pot, kept indoors, failed absolutely. That applies particularly to the mountain plants, but it will be well worth a trial for the remainder. Most of them require some extra stimulus. There are species with much larger flowers, like *H. procumbens*. It suckers well underground, and its flowers are also bright yellow, and about an inch across. Sometimes it makes a small shrub, but growing in a sand dune it suckers.

Baeckia diffusa is like a prostrate Leptospermum. It occurs on lower dry lands. As I was not in its district at seed time I did not get seeds, and as it probably was not hardy I could not waste time going there while there were other and much hardier plants to be had.

I found also a white-flowered variety of *Epacris impressa*, though it is perhaps a distinct species.

Many of the Australian plants are legumes: little hard, wiry shrubs, with gorgeous masses of small orange and brown, pale yellow and brown, or pale yellow and red, or orange and red flowers. One, perhaps the most beautiful, orange with red keels, is *Pultenaea Gunnii*. It has germinated well, and it is well worth a place indoors if we are unable to grow it outside.

Dillwynia floribunda is a representative of a genus distinguished by the very broad standard of the flowers, and it shows a very beautiful range of colour, from pale apricot to rich deep apricot and almost red, and a variation of colour in each separate flower.

Another legume, *Gompholobium Huegelii*, occurs over a wide area in Australia, unlike most of the plants, and in Tasmania it is only found in the drier and warmer districts. It is of a pale yellow colour, with a smoky-grey reverse. It is a distinct plant, and one not easily grown.

One of the gems of the whole collection was *Chamaescilla corymbosa*. It is not a plant for everybody, but for those who grow good crocuses well, it is a plant which they will be able to manage with equal success. It has flowers ¾ inch across. They are of a bright cornflower blue. The plant is about 6 inches high.

Isotoma fluviatilis carpets the ground where it is found, and particularly in the bogs which are near the forests. It is not often seen in the dry country.

One of the plants, of which there is a specimen shown by Colonel MESSEL in the Hall below, is *Olearia floribunda* (fig. 30). It has very

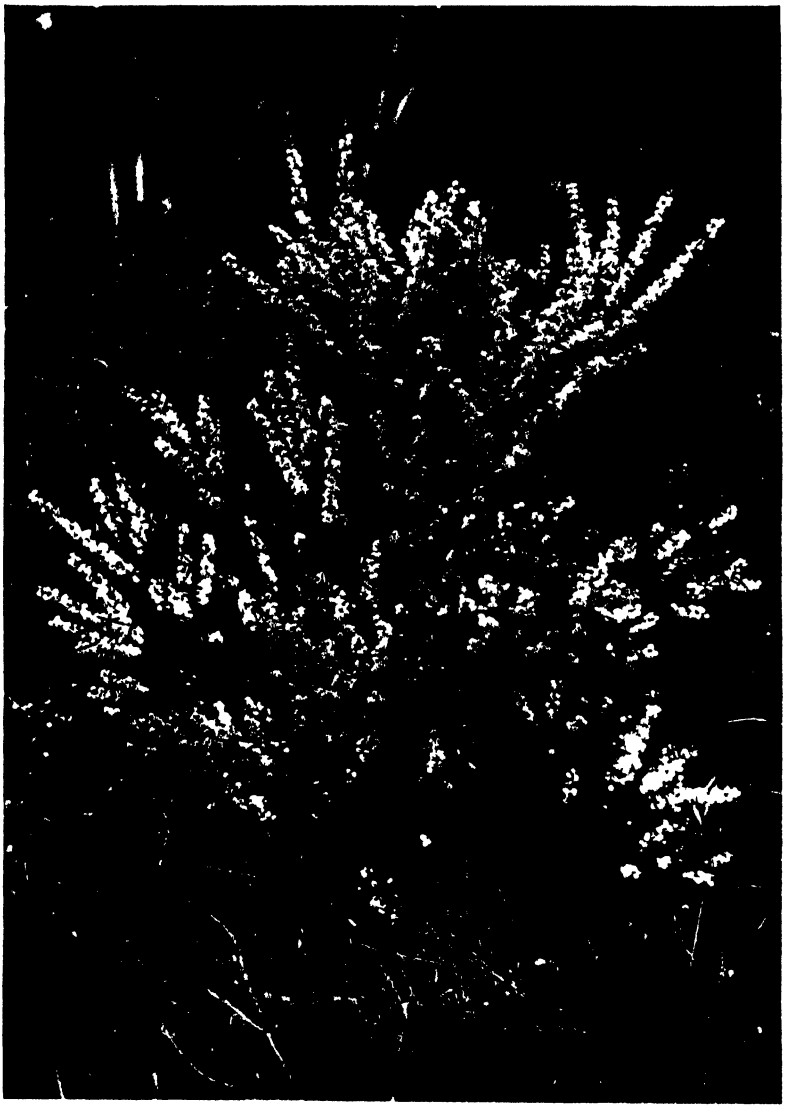


FIG. 31.—ACACIA VERNICIFLUA
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FIG. 32 MELALEUCA SQUARROSA

minute leaves, with flowers composed of three ray florets, and one or two florets in the disc. It grows in the moister parts of the dry heaths; it is never found in very sloppy ground. It is often 5 or 6 feet high, but it may reach no more than 3 feet. In the distance it looks like a large Spiræa.

Patersonia glauca grows in a similar situation, particularly where there is more exposure. Its flowers are pale mauve. Each flower lasts no more than one or two days, but a succession of flowers is produced, resulting in a pretty effect being maintained for quite a long time. Its height is about 6 inches.

One of the best of the Acacias is *Acacia verniciflua* (fig. 31), and it is likely to prove hardy. It has a beautiful pale yellow flower, and is usually about 6 feet, sometimes as much as 14 feet, high. It is distinguished from other species by having two veins in the phyllode, as the reduced leaf is called.

I found also a very pretty pale yellow " bottle brush," *Melaleuca squarrosa* (fig. 32). I do not hold out great hopes of this being hardy, but it is too beautiful to pass over without giving it a trial. It is usually found about 6 feet high, and in other districts it may attain to 20 feet. *M. squamea* is usually white-flowered in the mountains, but more often in the valleys the flowers are of a pale mauve colour.

Blandfordia marginata is a plant found at more varied elevations than any other perennial in Tasmania. We find it at sea level, and also in the National Park at a height of 4,000 feet. It occurs in dry areas in the Island of Bruny, and on the mountain sides on the west coast, where the annual rainfall is 100 inches, or even more. And I need scarcely say that at the height of 4,000 feet much snow and severe frosts occur in mid-winter. My seed was collected at a fairly high altitude, though not so high as I could have wished, and that was because of the previous bad seasons. I think there is a great future for this plant. My specimen shows only one flower spike, but plants on Mt. Sedgewick on the west coast often have over twenty, and paint the hillside red. The flowers are bright red, yellow inside and on the tips of the petals.

A beautiful mountain and forest area has been reserved by the Tasmanian Government as a National Park, and is still practically in a natural state. It contains the finest waterfall in Tasmania, the Russell Falls (fig. 33). There are many tree ferns, large Nothofagus trees, and above them all is the giant Swamp Gum, *Eucalyptus regnans*. I do not like to say how high those trees are, but most of them rise well over 100 feet, and they have large trunks at that. They provide a light shade for other things. Denser shade comes from the over-growing Nothofagus, and under these are tree ferns, and under these again, there are little orchids, not of any very great garden value, but nevertheless very interesting.

The Horseshoe Fall in the same river, a little above the Russell Falls, is at the foot of the National Park, and there is a wealth of ferns growing in the moist gullies.

Another waterfall is known as the Lady Barron Falls; it is also at the foot of the National Park.

In the moister districts are some of the best specimens of *Clematis aristata*, which is perhaps even more beautiful when in fruit than in flower.

The tree ferns near the Falls are from 8 to 20 feet high, and are often covered by a very interesting epiphyte, *Tmesipteris tannensis*, like Lycopodium and Psilotum, an ally of the Ferns.

Fig. 34 shows the trunk of one of the giant gums, *Eucalyptus regnans*. I could not get round the corner to give an idea of what the buttress was like, but you could stand a horse on one side of it so that it could not be seen from the other. Like many other species of Eucalyptus, the bark peels off, and long strings of it, 20 or 30 feet long, hang down, tying the undergrowth together. These strips are tough, and very awkward to get through, but it is only one of the many things which tie up Tasmania.

Gnaphalium alpigenum does occur in low moist places, but it is more usually found on the mountains. It is the nearest approach to Edelweiss, and is commonly called by that name in Tasmania.

A plant which has been grown for a long time in British gardens, *Ozothamnus thyrsoideus*, has the habit of making a more or less horizontal shoot, and flowering on the upper side. Less well known is another of the beautiful leguminous shrubs, which has the merit of growing in moister places; it is *Oxylobium ellipticum*, of a very beautiful apricot colour. Even if the plant is not hardy, it is worth an extended trial in greenhouses.

Bauera rubioides has been in cultivation a number of years, but it is always the pink form which is grown, and which belongs to the mainland of Australia. In Tasmania it is usually pure white, and grows at 3,500 feet, making dense mats there. There is every probability that it will prove hardy in this country. It is one of the worst things in the bush; the stems are long and wiry, and if I have been tripped up by it once, I have been tripped up a thousand times. It is known in Tasmania by a number of unprintable names, beside the more common one of "Tanglefoot."

Gaultheria hispida has large white berries, and is pretty. One of Tasmania's best plants is *Telopea truncata*; its flowers are scarlet and very like those of *Embothrium coccineum*.

Anopterus glandulosa should be fairly hardy, but I do not think anybody succeeds with it. Still, in Tasmania it grows in parts which are 2,000 feet above sea level, and it grows very freely, which our garden plant has never done. It should grow in similar situations to those which suit some of the shade-loving rhododendrons. If anybody has raised it, he should make the most of it, and not consider it to be the same form which he may previously have had.

Richea pandanifolia (fig. 35) is one of Tasmania's practical jokes. You might think it was a monocotyledonous plant, but it belongs to the family Epacridaceae; it is the "Pandanny" of the bushman,

and he is glad of it, because of the quantity of dry dead leaves he is able to find on the lower part of the stem. No matter how much rain has recently fallen, he can always light a fire with them. I ask you to notice the way in which the leaves shelter the lower portion, and the long time they persist; the plant must have taken hundreds of years to grow to that height, and yet these leaves still remain. The flower is quite insignificant.

In the boggy places on the top of the mountains, and in many of the upland valleys, we find *Athrotaxis cupressoides*. It is very beautiful, but in this country it grows a rich green, while in Tasmania it is always golden greenish-yellow. Further up on the mountains in Tasmania the vegetation is scarcer, but near the Twisted Tarn at 4,000 feet you still find *Eucalyptus coccifera*, and a mass chiefly composed of the smaller conifers, which are very interesting plants.

There is a shelf 4,000 feet high, with an escarpment going up another 400 or 500 feet. In the gully there is a mass of *Athrotaxis cupressoides*. As the previous seasons had been so bad, I was able to get only a few flowering or seeding plants here.

At a height of 4,000 feet one finds a lighter coloured patch, composed of *Nothofagus Gunnii*, the only deciduous tree in Tasmania. It is hardly worthy of the name of tree because it is rarely over 6 feet in height; it is confined to the Tasmanian mountains. Nothofagus is found in New Zealand and South America, as well as in Tasmania and the mainland of Australia.

On the top of the Tasmanian mountains there are many interesting cushion plants, and they are usually of two habits. In one of them you get the main stem persisting on the ground, and growing at the apex, with little upright flowering branches given off; and in the other there is a rounded hummock, in which all the branches have a similar origin and diverge. *Dracophyllum minimum* is one of them. Another cushion plant is *Mitrasacme Archeri*, which belongs to the same family as Buddleia and has the same honey scent. I was never lucky enough to find a showy specimen of *Pernettya tasmanica*, and I have not seen a good one in this country at all comparable to the little Pernettyas of the Andes.

From the top of Mt. Field West in the National Park one can look down 2,000 feet on to the edge of the forest, and then still further down, probably another 1,000 feet, is the forest in the valley. One must never attempt to go down those rocks, as they are very loose and treacherous. It would be hopeless to attempt to collect in these crevices, and I do not think there are many plants there, or if they are there I do not think they will be collected, or at least not until they naturally come down to the bottom; it would be far too dangerous to attempt collecting.

On the tops of some of the other mountains in National Park are barely discernible tracks marked out by upright stakes. One of the plants from there is *Ozothamnus ledifolius*. It is shown in the Hall downstairs; it will be a beautiful plant one day and is so fragrant

that one can smell the aromatic foliage a mile off, while the flower is as good as any species I have yet seen.

Another of the mountain plants is *Olearia revoluta*, a very beautiful little species rarely more than 2 feet high. There are three species with similar flowers; their foliage varies very much. Another is *O. pinifolia*; it is a good flowering form. *O. persoonioides* is very similar but has broader leaves. One of the real gems of Tasmania we have not many examples of in the country; it is *Prionotes cerinthoides*, which takes the place of the *Mitraria* in the Valdivian Forest of Chile and like it, climbs up tree trunks to 40 or 80 feet.

We now go down to the Hartz Mountains in the south. We have been in the National Park. Here is the *Eucryphia lucida*, hardy in Britain, and a bright orange-berried plant, *Coprosma nitida*. The last varies a good deal; it is common in the mountains, and is quite hardy but it will not be a success unless several plants are grown together.

We now go half-way down the west coast. One must go up from Hobart by car across farmed country, and since there is no road connecting the north and west, and it was only last year that a road was cut through by Lake St. Clair to the west coast, all traffic has had to go north and by railway.

About half-way over we come to a sparsely wooded tableland, covered with acres of splendid everlastings, among them *Helipterum anthemoides*, with white flowers and very narrow leaves. It has been in cultivation and is hardy in a dry place. Then there is *Helichrysum acuminatum* (fig. 36), with flowers of a brilliant golden yellow inside, and darker on the outsides of the bracts. It also has been in cultivation, having passed under the group name of *H. bracteatum*, which includes many diverse types, even the familiar gay coloured ones of our gardens.

The forest vegetation on the banks of the Savage River, a tributary of the Pieman up which we rowed many miles, includes in one locality the Huon Pine, *Dacrydium Franklinii*. Thence I went on to Queenstown, practically supported by the Mt. Lyell Mining Co. Here nearly all the surrounding country had been laid waste by sulphur fumes from the works. Mt. Owen, 3,600 feet, shows this well. *Eucalyptus vernicosa* was least injured of all, and now the fumes are somewhat abated it is growing freely again.

On Mt. Sedgewick I had my first sight of that very beautiful plant, *Prionotes cerinthoides*, in full flower. It was bright pink with red buds, and differs from the National Park variety in having longer, narrower flowers.

On a short visit to the East Coast I found *Banksia marginata* in full flower at Coles Bay, and on the sand dunes in Wineglass Bay, to which we tramped one day. On the way I found the largest-flowered species of Leptospermum I have ever seen. The flowers are up to 1½ inch across at their best, and pure white. As it had never been described, though mentioned as an interesting plant by Mr. RODWAY,



FIG. 53.—ROAD TO RUSSELL FALLS, NATIONAL PARK, TASMANIA.

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FIG. 34.—TRUNK OF EUCALYPTUS REGNANS
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FIG. 35 RICHEA PANDANIFOLIA

(P. 38)



it has since been named *Leptospermum Rodwayanum*. Unfortunately it will probably not be so hardy as the other species, for the reasons I have already told you.

Acacia maritima was very beautiful here, and although perhaps not so hardy as some other species, may be more useful because it flowers in autumn, and does not carry vulnerable flower buds exposed through the winter, like most of the genus.

Now there is one more point I should like to make.

To those of you who have seeds or plants, I would particularly point out that the names of many seeds numbers have been changed in the revised list, some because of the law of priority, but many because it became evident that they were not conspecific with the mainland plants.

Thus, as distinct species from those which have been found wanting in the past, they deserve a thorough trial, and while I would no more expect them to flourish in ordinary kitchen garden soil than the innumerable Rhododendrons recently introduced, I feel that the majority of the mountain species will find an honoured place in the shrub and alpine gardens when their needs under British conditions become known.

Whatever conditions may be too much for them, I am positive it will not be too much cold and wet alone.

IMPRESSIONS OF GARDENING IN NEW ENGLAND.

By A. Osborn.

[Read June 30, 1931; Mr. W. B. Cranfield, F.L.S., in the Chair.]

As most of you know, I am connected almost entirely with trees and shrubs at Kew, and much of what I have to say will be of trees and shrubs; but while in America I also took the opportunity, of course, of studying other phases of gardening.

The best known and most important centre for trees and shrubs in the Eastern States is the Arnold Arboretum. Unlike Kew, the ground is beautifully undulating, and those responsible for the lay-out of the Arnold Arboretum have taken full advantage of the hills and dales (fig. 37).

The Arnold Arboretum is open to the public throughout the year. Motor cars are allowed in by special permission, but it is not open for general motor traffic; the gates are closed for vehicles at night, but always open for pedestrians. The Arnold Arboretum is almost as large as Kew—260 acres. Unlike Kew, there are no greenhouses, except two or three for propagating purposes; it is entirely devoted to the cultivation of trees and shrubs. There are a few wild herbaceous plants, but no attempt is made to cultivate them.

About 7,000 species and varieties of trees and shrubs belonging to 350 genera are grown there, of which 4,500 are natives of America and about 2,500 are exotic.

The Administrative Building houses not only the offices, but also the Library, Herbarium and Museum. During the first fifty years of its existence the Arnold Arboretum received approximately 200,000 plants and 30,000 packets of seeds, and distributed 250,000 plants and 63,000 packets of seeds. In America it is popularly referred to as "the clearing house for trees and shrubs." Wherever I went in America, all spoke in praise of the Arnold Arboretum. The authorities there are very generous. As you know, the sale of tree and shrub seeds is not a commercial proposition; but it does not matter whether the application is from a private individual, a nurseryman, or a firm, if they are able to supply seeds or plants not readily purchased from the trade, they very willingly do so. There is a very extensive Library of about 40,000 books dealing with botany and horticulture and a very large collection of photographs of trees and shrubs. There are between fifteen and sixteen thousand photographs, all filed, so that visitors, if they want to see anything particular, which is not in flower at the time of their visit, can go to the Administrative Building and see photographs, most of them taken in the Arnold Arboretum.

On the end of the Administrative Building the Japanese climbing *Hydrangea petiolaris* is a feature. It is one of the best of the climbing, self-clinging flowering shrubs; it has grown entirely without support except just to start with. The plant was a cutting in 1906, so it is only 24 years old but is 50 feet in height; it would have grown more had the building allowed it.

Magnolia stellata is very well known in this country. Before I went to America my impression was that it was rather spring-tender and required some protection. As you know, in the part of America where the Arnold Arboretum is situated, in Massachusetts, the summers are warmer and the winters are colder than with us in England; in winter the thermometer is frequently down to zero. But these magnolias grow away quite unharmed. Actually there seems to be a definite line between their winters and summers—that is to say, when the frost is finished, it is finished; not as in this country, where one gets some warm weather in January and February, so that the Magnolia buds begin to swell, and then in March and April a frost which cuts back the shoots. I was told *M. stellata* had not been "cut" once in thirty or forty years at the Arnold Arboretum, but had always flowered freely.

The great thing lacking in the Eastern States of North America is the large-leaved evergreens; they are not hardy. Holly cannot be grown, for instance, in the Arnold Arboretum, nor the ivy nor the evergreen oak, and they have to rely on conifers for their evergreens.

The wild Michaelmas Daisies of North America, notably *Aster cordifolius* (fig. 38), grow with remarkable freedom in the shade of the trees. Another common plant growing wild is the Poison Ivy, *Rhus Toxicodendron*. In our public gardens we keep children and people away from it, but out there it is just as common as wild blackberries in our woodlands in this country. Judging from the brilliant colour we get in the species in this country, the Arnold Arboretum must be a wonderful sight in the autumn. I do not recommend you to plant this species in this country, because it is inclined to give people eczema, even more than *Primula obconica*.

An idea worth copying in our public parks is the planting of a hedge between the motor road and the ordinary footpath. For this purpose *Rosa virginiana* (fig. 39) is used in the Arnold Arboretum, growing from 4 feet to 5 feet high, and with pink flowers; it makes a most effective hedge, and it was a delightful sight when I was there. It was then in full flower, to be followed in the autumn by the very attractive red fruits.

One of the important features of the Arnold Arboretum is Hemlock Hill (fig. 40), covered almost entirely with *Tsuga canadensis*. This is one of the places in the Arnold Arboretum left entirely untouched by the cultivator. Self-sown seedlings continue to grow, taking the place of old trees blown down or removed for the safety of the public. Walking over this hill I could plainly see three generations—the grandfathers, as the local people call them, then the sons and the grandchildren.

I saw some wonderful bushes of *Kalmia latifolia*, or Mountain Laurel, as it is called, in flower up to 16 feet to 18 feet high. In a few places it does very well in this country, as in the Ascot district and also in Cornwall, but generally it does not like our British climate as well as that of America, where of course it is a native (fig. 40).

Azaleas do remarkably well in the Arnold Arboretum, as one would expect, a number being native of North America, notably *Rhododendron nudiflorum*, *R. calendulaceum*, *R. Vaseyi* and *R. viscosum*.

R. poukhanense is a native of Korea and was introduced into this country and into America by the late Dr. WILSON.

The Japanese *R. Kaempferi* was introduced by Professor SARGENT, who was the first Director of the Arnold Arboretum. I think he collected seeds in Japan about 1895.

Trees and shrubs flower with remarkable freedom in this part of America. This is probably largely due to the amount of sun they get there; all the wood is thoroughly ripened by the sun in the late summer and autumn and by the hard winters. *Pyrus ioensis* (Bechtel's Crab, as it is called) is the largest flowered of the American or, in fact, any of the crabs; the blooms are 2 inches across and deliciously fragrant. We have it at Kew, but I have never seen it flower as freely as it does in the Arnold Arboretum.

P. Sargentii will be familiar to many of you as one of Professor SARGENT'S introductions from Japan. It is rather a low-spreading Pyrus, suitable for small gardens. Some British nurserymen have budded or grafted it on standard and half-standard crab stocks, and it makes a very good tree, but it is also a very good flowering bush.

P. baccata, one of the Siberian crabs, is of course a very well-known flowering tree in this country, and notable for its fruit in autumn and winter. The Manchurian form flowers freely in the Arnold Arboretum.

The Apricot is a native of North China, and it seems to do very much better in the Arnold Arboretum than we are able to grow it at Kew. It is "cut" with us in the spring, but in the Arnold Arboretum it was flowering with remarkable freedom. I am inclined to think we shelter some of these things too much and they are "cut," whereas if we had them fully exposed we might get better results than by trying to protect them as we do.

Prunus Sargentii, or, as some botanists call it, *P. serrulata Sargentii*, is the wild type of Japanese cherry which has become so popular in this country. The wild tree is a fine, upstanding thing, though not so suitable or valuable for small gardens as the double, or semi-double, named varieties. It is a beautiful tree for planting by the waterside, as those in the Arnold Arboretum demonstrate.

P. incisa, an early flowering Japanese cherry, does not grow more than perhaps 12 feet or 15 feet high, and is a wonderfully free-flowering tree for small gardens.

Another very useful bush Prunus for small and large gardens is *P. tomentosa*, a very common tree in Central and Western China, judging by the number of packets of seeds which Chinese collectors



FIG. 37. GENERAL VIEW IN ARNOLD ARBORETUM



FIG. 38 — ASTER CORDIFOLIUS IN THE ARNOLD ARBORETUM

To face p 45

have sent home. We have had it at Kew from WILSON, FORREST, KINGDON WARD and others. Bushes raised from Chinese seeds show considerable variation; one that attracted my attention in the Arnold Arboretum was about 10 feet high and 9 feet through.

P. Watsonii (the Sand Plum, as it is popularly called) is a North American native tree. It will stand any amount of wind and exposure: the more exposure it gets the more freely it seems to flower.

P. subhirtella is a very well-known tree in this country, but I have never seen it flower so freely as it does in the Arnold Arboretum. It is one of the Prunus that is readily propagated from cuttings; most of them have to be grafted or budded, or, if species, they can be raised from seeds.

Kolkwitzia amabilis is one of WILSON's introductions from China. So far I have never seen it flower so freely in this country as in America; out there it is known as the "Beauty Bush" and is very popular. One nurseryman had 20,000 young plants ready for distribution last autumn. That gives you some idea of how it has "caught on" in America. Evidently it wants more sun than we get in this country. It must be planted out in the sunniest available positions.

Cornus Kousa chinensis (fig. 41) was one of the best shrubs I saw in America. The flower is inconspicuous, but four white bracts develop in advance of the leaves. A bush in the Arnold Arboretum was a wonderful sight. At a distance it looked as if covered with snow; it was about 12 feet high. It received a first-class certificate when exhibited in the Old Hall of the R.H.S. a few years ago. Why it has not been more freely propagated in England I do not know; it certainly should be more largely grown.

Fothergilla major is a native of North America. That again is a shrub to which we are giving protection in this country, but as it is growing out fully exposed in America, it certainly does not need it, except from rather late spring frosts.

F. monticola is even more beautiful than the last, though not so well known in this country. The white flowers are even more showy, the leaves are thicker and broader, and the bushes are more spreading, but not so tall. While the foliage of *F. major* is golden yellow in autumn, *F. monticola* is quite a reddish scarlet, and must be a wonderful sight in the autumn. We have small plants at Kew.

Viburnum Carlesii, one of the most delightfully scented of all hardy shrubs, is another plant which we have been inclined to protect thinking it was perhaps a little tender; but there it was growing in the Arnold Arboretum, quite hardy, fully exposed, and all around could be smelt the delicious fragrance.

Enkianthus campanulatus has greenish golden-yellow flowers, tinted with red; a bush 15 feet high growing under a pine tree was a wonderful sight about the middle of June. The spring in America is a little later than in this country, but plants come on very rapidly, and by midsummer plants that flower here at that season are in flower there.

Now I come to the parks. In the City of Rochester there is a wonderful park system of something like 1,740 acres. There is very close friendship with the Arnold Arboretum, and many surplus plants from the Arnold Arboretum find their way to the Rochester parks. Conifers in particular do exceptionally well. Rochester is quite close to Lake Ontario. The atmosphere and other conditions evidently suit conifers exceptionally well. The Superintendent is Mr. BERNARD SLAVIN. In the Durand-Eastman Park, comprising 484 acres, there are 178 species and varieties of conifers growing. They lack things like ordinary evergreens, but this lack is much more than made up by the abundance of the evergreen conifers.

The Wilson Spruce Hollow in this park was particularly interesting. It is planted with Spruces and Piceas, grown from seed collected by WILSON in China. When they were raised in the Arnold Arboretum a share was sent to the Rochester Parks, and they are in even better condition than in the Arnold Arboretum. The young trees were 18 to 20 feet high, and some of them coning freely.

Prunus nigra we grow in this country a little; it is a very attractive bush with its autumn colouring, but I have never seen it flower as freely as I saw it out there (fig. 42). It was a wonderful sight, and it looked like snow when we were on the hillside looking down at it.

In the Durand-Eastman Park there is a special area set apart for Pyrus species and varieties planted in groups (fig. 43). They have something like 200 species and varieties. I saw *P. aldenhamensis* and other British-raised hybrids as well as those raised in America. Americans have the advantage over us—they are not stinted for space. They have ample room for planting; they have their cars and can travel about very quickly from the different places. It is surprising to see the number of people who visit the public parks and open spaces at week ends.

Cornus florida is grown in this country, but it is one of the things that are "cut" in spring, and does not get sufficient sun here to grow and flower as freely as it does in America. In the City of Rochester parks alone they have 6,000 *Cornus florida*. Its great Spring beauty is due to the white bracts when the plants are in flower. Unlike flowers, these bracts last very long; from the time they start to develop to the time they turn green I suppose they are probably three months in beauty. Some of the largest groups were in the Genessee Valley Park of 584 acres, which also belongs to the City of Rochester.

Highland Park is almost like a botanic garden; the plants are grown under their various families and attention has been given to individual species and varieties rather than masses of one thing. In this park of 108 acres, scarcely half as large as Kew, there are 236 species and varieties of conifers and 384 varieties of Lilacs. We hear something about "Come to Kew in lilac-time," but the Americans make even more of Lilacs than we do. Not only in Rochester, but in the Arnold Arboretum and other public parks in America there

is a "Lilac Sunday," and the people roll up in their cars in thousands.

At this park also a speciality is made of some of the wild Roses, both species and ramblers, not the garden-pruned hybrid Teas, but semi-wild ones. They have a Rose-garden with 250 species and varieties.

In this country I am under the impression that Pæonies do better with some shade, and that they flower more freely in semi-shade than they do in the open, but a large planting of Pæonies in one of the Rochester parks is fully exposed to the sun; there is a little shelter, but as far as sun goes they get all the sun possible. The way they flower is remarkable.

A large area of park-land and woodland in New York State is controlled by a Commission known as the Finger Lake State Park Commission. The name was given because on a map the positions and shape of the lakes somewhat resemble the fingers of a hand. A very remarkable series of parks is controlled by this Commission, and I took note of a few particulars. Their headquarters are at Ithaca; the Chief Superintendent of the parks is a former Kew student. In the area there are nine State parks with a total area of 4,000 acres. There are six lakes, and they vary from eleven to forty miles in length. The highways and roads of this area are also controlled by this State Commission. They are planted with trees, and the native vegetation is very well looked after by the Commission. In the parks there are sixteen golf courses available for the public.

Newark is a great centre for nursery cultivation. It contains Messrs. JACKSON and PERKINS' famous rose nursery—the whole town almost seems to belong to the firm of PERKINS. You are all familiar with the 'Dorothy Perkins' Rose which was raised at Newark.

Taughannock Waterfall, in one of the Finger Lake State parks, is 215 feet high. It is not so extensive, but it is even higher than Niagara, which is 165 feet.

Brooklyn is a suburb of New York City. The Brooklyn Botanic Garden is about 50 acres in extent and is very popular with New York people; and it has eight million visitors a year. An enormous number of specimens are supplied to the schools for teaching purposes—they seem to do that much more thoroughly than we do in this country. Not only do they supply specimens for teaching purposes, but in this garden alone they grow 25,000 plants a year in pots for decorating the schools.

Considering the size of the country, gardening is not much practised in America. There is plenty of commercial gardening, and people buy pot plants and cut flowers in immense quantities, but they do not cultivate their own small gardens to the extent that we do. A few millionaires and rich people have very good gardens, but they are comparatively few and far between. Around their houses they do not even plant a hedge; they may have grass leading up to the house, but there are very few hedges round small property.

Rose-gardens are not much planted in the eastern States. The trouble is that it is so hot that the flowers do not last long, and they have to be very well protected from the cold in winter. All the hybrid Tea Roses, I was told, are buried in winter with conifer branches to protect the growths; loam is also piled round the bases of the plants to make sure that, if the tops are killed, they will break from the base.

The Rose-garden on the estate of Mrs. LOUIS FROTINGHAM, in the State of Massachusetts, was a really wonderful sight when I saw it towards the end of June. The Roses flower a little earlier than in this country. I was very much amused at one feature. Although this was a private place owned by a lady a large number of cars were there and people were visiting it who were quite unknown to the lady; she did not mind a bit, as they had come to see her garden and she was very pleased for them to walk round as long as they did no damage. I do not know what people with estates in this country would say if they saw strangers walking about all over the lawns as they seem to do in America.

The Kelsey's Highland Nursery is a very well-known hardy tree, shrub, and herbaceous plant nursery firm. With a nursery covering an area of 450 acres, there is no question of walking round: the nursery is intersected with straight roads so that one can go round in a car. Very large numbers of Azaleas and conifers are grown. Commercial gardening is a much more extensive undertaking in America than in this country. I saw very little of the small grower or little men. It is the same with the vegetables, salads, fruits, and cut flowers: the Americans seem to have certain localities for these nurseries. There is not so much grown in the part of America that I visited, in Massachusetts and one or two States near by.

I was quite surprised to see the old favourite Rose, 'Kaiserin Augusta Victoria,' grown so extensively by Messrs. JACKSON and PERKINS. I do not think it is grown so much in this country as some of the newer white varieties. I was surprised to see a distance of 2½ to 3 feet between the Roses in the fields. Land is cheap, so that there is no object in close planting.

I jotted down a few particulars of Messrs. JACKSON and PERKINS' business organization. At the Newark nursery which I visited they have between 1,700 and 1,800 acres, and 300 employees. This firm also have 400 acres in New Jersey, 1,000 acres in Virginia, and 150 acres in California. One plant they grow which we do not do perhaps as much with as we might was *Berberis Thunbergii*; they had 200,000 in a block. It must be an absolute blaze of flame-coloured foliage in the autumn. Another tree grown extensively is *Picea pungens* var. *Kosteriana*. One block in the Newark nursery consisted of 75,000 young grafted trees. We see a few in this country, but nothing to this extent. The Dwarf Polyantha or Baby Rambler Roses are popular in America; the Americans buy them in pots for their rooms and verandas, and to plant round their houses, as they are hardier than the hybrid Teas. They had growing in this nursery 125,000



FIG. 39. HEDGE OF ROSA VIRGINIANA, ARNOLD ARBORETUM

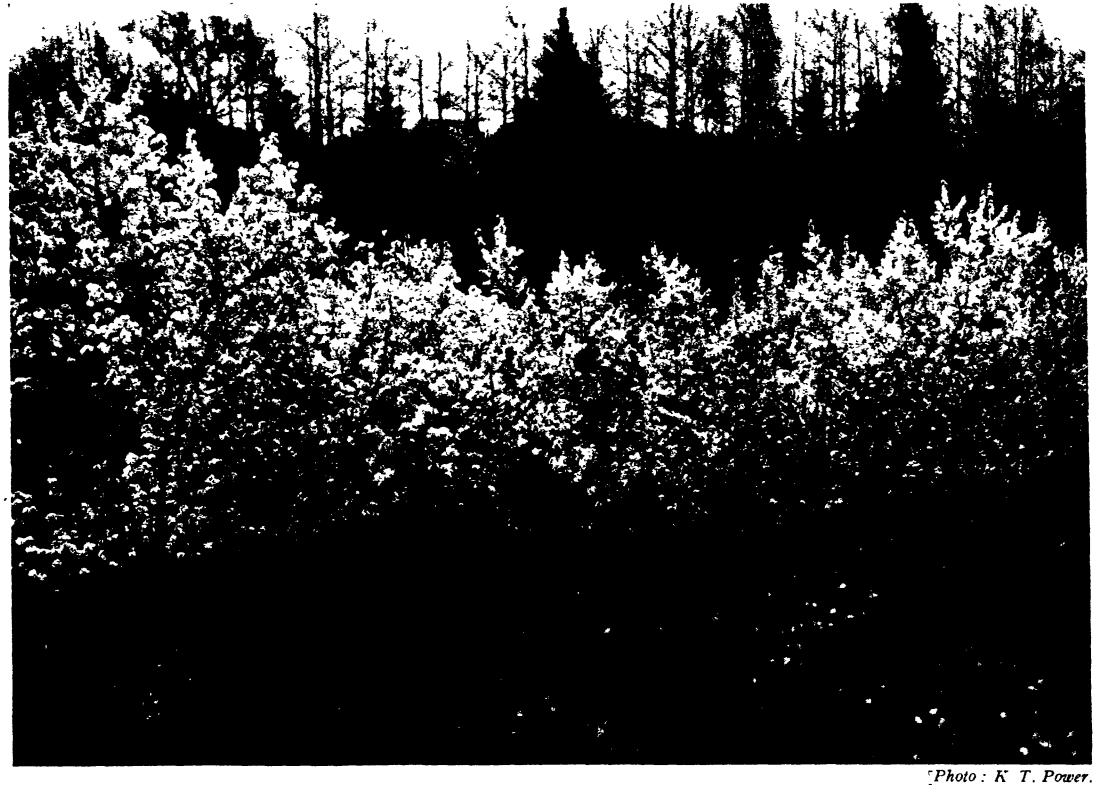
To face p. 45



FIG 40.—IN THE ARNOLD ARBORETUM. KALMIA LATIFOLIA IN FRONT. HEMLOCK SPRUCE BEHIND



FIG. 41 CORNUS KOUSA VAR CHINENSIS IN ARNOLD ARBORETUM



[Photo: K. T. Power.

FIG. 42.—PRUNUS NIGRA IN DURAND EASTMAN PARK, ROCHESTER, N.Y.



Photo K T Porter

FIG. 43. MALUS (PYRUS) GLAUCESCENS IN DURAND EASTMAN PARK, ROCHESTER, N.Y.



FIG. 44. ULMUS AMERICANA, ARNOLD ARBORETUM
P. 5

(Also face p. 49)

'Triomphe d'Orléans,' and another 125,000 Baby Ramblers and other well-known varieties. Generally it is mass production—thousands of a few varieties rather than a dozen of a large number of varieties.

Nearly everyone plants a few dwarf conifers close round their residences, which are often bungalows or wooden houses. They have a little narrow border, perhaps 3 feet wide, round the house—that is all they trouble to cultivate. Most of the things planted are conifers. They do not trouble with herbaceous plants or summer bedding plants; they merely want something green.

Messrs. BOBBINK and ATKINS' Nursery at Rutherford, New Jersey, grows a tremendous number of Azaleas, something like three million, as Mr. BOBBINK told me when we were driving round. They have a system of overhead watering or spraying after a hot day. The Azaleas are potted up in autumn, brought to the flowering stage in greenhouses, and practically all the three million grown in this nursery are sold in New York for decorating hotels, flats and private houses.

The Hydrangea is another of this firm's specialities. The plants are grown outside during the summer, potted in the autumn, placed in frames in winter, and moved to the greenhouses when the Azaleas are sold to flower in spring and early summer.

In the part of America I visited I saw no small nurseries or jobbing gardeners; everything is done on a tremendous scale. Messrs. PIERSON'S of Cromwell, Connecticut, is one of the largest glass nurseries in the country. It has 1,100,000 feet of glass devoted to commercial horticulture, either pot plants or cut flowers for sale. The largest glass house, 80 feet wide, was devoted to bush Roses. It was a wonderful sight early in the morning. There are 40,000 Roses planted out in this one house. Mr. PIERSON gave me a few particulars as we went round. The nursery is 850 acres in extent. They have 65 houses on the nursery for the foremen and superintendents of the different departments, so that they are all at hand when wanted. All are connected up with the telephone. Altogether 455 men are employed. They graft one million Rose trees a year all for their own use; they do not sell the plants, only cut flowers. For indoor culture they find grafted plants better than budded plants. I do not think grafting Roses is much favoured in this country, but Mr. PIERSON assured me that for greenhouse cultivation grafting was preferable. This firm send 40,000 Rose blooms a day to the New York market; they also grow large numbers of Orchids, Anthuriums, Gardenias, etc., for the New York market.

Although some of us may be under the impression that America, as far as gardening is concerned, is a new country, there are some old trees. The late Dr. WILSON took me to see quite a number in Massachusetts; among them the 'Beaman Oak,' so named because it was planted by a man named BEAMAN in 1659. This is an American Red Oak, *Quercus rubra*, 78 feet high, with a spread of 75 feet, 31 feet at the base and 19 feet round at 5 feet.

Because of the climatic conditions, the American Elm does not do

well in Britain. It is a wonderful tree in America (fig. 44) and very extensively used, not only in parks, but also as a street tree. One veteran I saw was 97 feet high, the spread of the branches 147 feet, and girth 28 feet. It is one of the largest in the United States and is said to be 250 years old.

I saw hundreds of these American Elms in the various parks in Massachusetts and other States. Unlike our Elm it branches from quite low down, and there is no danger from falling branches as there is with the common Elm in this country.

In the City of Rochester there is a wonderful avenue of this Elm. It is known as the Parkway and is one mile long: there are 450 trees planted in four rows, with a road on either side and a grass avenue down the centre. They were planted in 1893 and 1894. They are set 42 feet apart between the rows, and 32 feet between the trees in the rows.

The American Sugar Maple is another tree that does not thrive in this country, but in America it is a beautiful park tree and also a street tree, being not too wide-spreading.

CONTRIBUTIONS FROM THE WISLEY LABORATORY.

LIX.—Experiments with Ultra-Violet Ray Glass—II.

By M. A. H. Tincker, M.A., M.Sc.

The experiments described in this Journal, vol. **55**, p. 79, were designed to test the influence of natural ultra-violet light passing through glass upon the growth of certain common garden plants. This report deals with a later series on similar lines.

The glass to be tested glazed adjacent frames, each 6 feet by 4 feet, sloping from a height of 2 feet at the back to 10 inches above the soil level in front. The frames faced south and were separated by wooden partitions; the same heating was used.

We are indebted to Messrs. Pilkington Bros., St. Helens, for kindly presenting a further sample of Vita glass.

Conditions in the Frames.

The previous experiments and reports of other experiments * [13] published in gardening periodicals, had indicated that even small differences (of about $\frac{1}{10}$ inch as compared with $\frac{1}{8}$ inch) in thickness of the glass caused slight differences of temperature in the frames. In these experiments the thickness of the control ordinary glass and the Vita glass was equal. There are no indications that, given equal thickness, the heat rays pass more easily through Vita glass.

The use of maximum-minimum thermometers and special thermometers revealed very small differences under the two types of glass, in the temperature of the air when taken at a series of levels. The differences observed were of the following order:

On a warm sunny day in the afternoon the temperature under the Vita glass rose to approximately 1° F. higher than under ordinary glass.

With cool autumnal nights the temperature under the Vita glass frequently showed a tendency to drop to 1° F. lower than under ordinary glass.

All readings were carefully checked by alternating the position of the thermometers. For all practical purposes, therefore, the use of glass of equal thickness eliminates the temperature differences. Reports have also been published—see for example Secrett [12]—that under Vita glass condensation of water vapour was more pronounced. In the experiments here reported this was not found.

* Reference by no. to literature cited.

Such differences in condensation were probably due to differences in the rate of cooling of the air under the glass, a more rapid loss of heat taking place through thinner glass.

Before each experiment the soil compost was mixed and divided equally between the frames covered by Vita and ordinary glass.

Some criticism has been made [2] that the earlier report did not indicate the amount of ultra-violet light received by the plants. An accurate quantitative estimation of the short waves transmitted by Vita glass and not by ordinary glass—that is, of the band between 3,200 Å.U. and 2,910 Å.U.—is a matter of considerable difficulty in a garden frame in which plants are growing (see [1]).

Of the available methods—limited by ease of manipulation—none are entirely satisfactory. A comparison of these methods has been made by GILLAM and MORTON [4]. The method of HILL [6] was tested, quartz tubes containing methylene blue in acetone being exposed to the light in the frames during the day. By this method the reduction of the methylene blue coloration is estimated by colour matching with standardized solutions. The units of the scale are not precise, the scale is standardized biologically by determining the bleaching produced in the methylene blue by exposure to the ultra-violet light that causes a moderate erythema of the skin of the upper inner surface of the arm of a white-skinned person. A further difficulty, one that can be overcome, however, is due to the fact that the reaction proceeds in a reverse direction to a limited extent in the dark; so that a continuous record cannot be obtained by leaving the quartz tubes in the frames overnight.

The methylene blue scale was tested by means of mercury vapour lamps to see whether agreement could be obtained with other methods and between comparable readings. The LEVY-WEST actinometer method in which coloured pastilles are used, although one that is easily manipulated and therefore suitable for our purpose, did not give satisfactory results. The results obtained with the methylene blue method can only be described as fairly satisfactory.

In the frames the colour-changes under ordinary glass were very slow; on the majority of days exposure for the entire period of light resulted in very little, if any, change. Under Vita glass on a clear day in early summer, a change representing 2 " units " was sometimes observed.

The greatest weekly difference observed in 1930 and 1931 between the two series amounted to 11 units. During these experiments the glass was kept clean.

THE GROWTH OF THE CROPS.

Experiment 1. *Spring*, 1930. *Frames heated and kept closed. Temperatures equal. Radish.*

Seed of Forcing Radish was sown in drills late in February. After the required thinning the plants grew until April 10, when they

were removed, cleaned and weighed. After separation into roots and " tops " small samples were dried and re-weighed.

	No. of Plants.	Average Weight of Plant. Fresh.	Average Weight of Roots. Fresh.	Per Cent. Dry Matter. Tops.	Per Cent. Dry Matter. Roots.
		Grammes.	Grammes.		
Control glass	100	16·28 ± 0·17	8·51 ± 0·09	6·5	4·57
Vita glass .	100	16·06 ± 0·14	8·74 ± 0·11	7·2	4·96

The plants were for all practical purposes equal in size and weight. The only difference in the two series was a small one observed in the percentage of dry matter contained in the tissues. The proportion of root to shoot in the plants was slightly higher under the Vita glass.

Experiment 2. *Summer*, 1930. *Radish. Approximate difference in ultra-violet light, 24 units.*

The plants were removed from the frames on August 5.

	No. of Plants.	Average Fresh Weight.	Per Cent. Dry Matter.
		Grammes.	
Vita glass . .	135	25·7 ± 0·03	6·75
Control glass .	125	26·5 ± 0·09	6·94

The entire plants of the two series were for all practical purposes equal in weight. A difference was observed in the proportion of root and leaf in the two series. Under Vita glass the ratio root/shoot was slightly greater than under the ordinary glass.

Experiment 4. *Spring*, 1931. *Radish. Approximate difference in ultra-violet units during period*, 17.

The plants were removed in April, sowing having taken place at the end of January. The following data were collected:

	No of Plants.	Average Fresh Weight.	Per Cent. Dry Matter.	Per Cent. Root.
		Grammes.		
Vita glass . . .	100	9·712	8·9 leaf 6·1 root	67·5
Control glass . .	100	9·880	9·2 leaf 5·5 root	52·0

In general appearance there was a less " leafy " crop under the Vita glass than under the control glass. In fresh weights the plants were almost equal, but the plants growing under the Vita glass showed a

higher ratio of root to shoot, and a slightly higher content of dry matter in the root.

Experiment 3. *Spring*, 1930. *Lettuce. Difference in ultra-violet light, about* 15 *units.*

The variety employed was the black-seeded Early Paris or Gotte Noire suitable for frame forcing. Sowing took place in the middle of April. The plants were removed and weighed on June 18, 1930.

	No of Plants.	Average Fresh Weight per Plant.	Average Height.
		Grammes.	Cms.
Vita glass	54	81·0 ± 1·4	26·8 ± 0·4
Control glass	52	88·6 ± 1·1	27·4 ± 0·4

The plants grown under the Vita glass were slightly lighter in fresh weight; they, however, showed less tendency to " bolt " than did the control plants, in which elongation of the stem was a little more rapid.

Experiment 5. *Spring*, 1931. *Lettuce.*

This experiment was a replica of No. 5. The plants grew in the frames from April 10, 1931, to June 15, 1931. Approximately 30 more " units " of ultra-violet light reached those under the ultra-violet glass.

	No. of Plants.	Average Fresh Weight.	Average Height.
		Grammes.	Cms.
Vita glass	50	63·50 ± 0·17	22·0 ± 0·2
Control glass	53	63·53 ± 0·19	24·3 ± 0·3

The plants of the series were equal in weight and also in height. It was again observed that the plants under Vita glass did not begin to bolt quite so soon as under the control glass. This difference was, however, not large.

Experiment 6. *Summer*, 1931. *Cucumbers.*

Plants of the variety ' King George ' grew from June 18 to September 10 under the two types of glass. In number and weight the cucumbers picked were approximately equal in the two series, though under the somewhat cooler conditions of this season there was little opportunity to test the scorching of the leaves under the different types of glass. It appeared as if there was a *slight* tendency for leaves under the Vita glass to become scorched more easily than similarly placed leaves under the control glass.

Results.

The results taken as a whole do not indicate any striking differences in yield. With the radishes, however, a tendency to form a higher proportion of root to shoot was found in all the tests. With lettuce the plants were equal in fresh weight; under Vita glass elongation of the stem seemed to be retarded slightly.

It may not be out of place to compare these observations with results obtained in other localities where the quality, intensity and duration of the light differs.

With a trial of lettuce and other crops Secrett [12] reports that lettuce produced earlier plants grown under Vita glass. He also stated that the condensation observed on the underside of the Vita glass was more than on the ordinary glass. This observation inclines one to wonder whether the thickness of the two types of glass was the same. If not, as seems likely, then temperature differences might be responsible for part of the observed earliness.

Pilkington [9], discussing the report of a firm of growers of cucumbers, remarks upon an increased yield of 16 per cent. with this crop. Whether part of this increase is due to temperature or whether it is solely due to the ultra-violet light is not quite clear.

Stewart and Graham [5], using small frames, obtained results favourable to Vita glass as compared with ordinary glass in growing savoys, dark red beet, and radish, but unfavourable results with maize and other plants. Measurements of the ultra-violet light were also made.

Reference to other published reports of tests made in this country will be found in my earlier article.

Amongst the reports from foreign stations Reinhold and Schulz [10] state that crops of radish, spinach, lettuce, dwarf beans and tomatos were larger by some 10 per cent. under glass transmitting ultra-violet light, but melons and cauliflowers (possibly carrots also) did not yield so well. The slight temperature differences observed were eliminated by differential ventilation. A later report by the same experimenters [11] indicates that no significant differences were observed in favour of the ultra-violet transmitting glass in the experiments they made at Dahlem. Osmun [8] found that radishes gained in weight more rapidly under Vita glass; he too observed the increased proportion of root to leaf growth. His tests were made at the Massachusetts station. With lettuce he also found in favour of Vita glass, recording heavier plants and better "heading," but with Calendulas and pansies consistent results were not obtained.

Tottingham and Moore [14] of Madison tested a number of species under Vita glass. Whilst with wheat, soy beans and Coleus growth was somewhat suppressed, with other plants flowering and fruiting were accelerated. In a letter, Tottingham, referring to some

results of work as yet unpublished,* states that as a result of his chemical investigations made upon tomato plants grown under Vita glass, whilst he found the young plants more susceptible to frost than the control plants grown under ordinary glass, the fruits were larger and contained more acid. A consistent result was the increased lipoid (ether extract) content of the plants grown under Vita glass. It appears that the increase in this fraction was not due to an increase in chlorophyll, so that it was presumably due to more fatty matter. The same author reports an earlier production of flower buds by Chrysanthemums under Vita glass.

McCREA [7], working with *Digitalis purpurea* upon the effect of radiation through solarized glass transmitting ultra-violet rays, found a lower potency with plants under ordinary glass. He indicates that solarization for one year of the Vita glass did not affect appreciably the transmission of the portion of rays responsible for this change in the plant. This raises the question of solarization and the changes in the glass. A discussion on this point has already appeared in another journal, and is somewhat out of place in a horticultural one. Suffice it to say then that WOOD and LEATHWOOD [15, 16] consider that the exposure to four days' bright light is sufficient to bring about these changes. ENGLISH [3], however, considers the process to be longer, covering a period of several months.

We note, however, that the rejuvenation of artificially radiated glass in sunshine can take place. It appears also that " solarized " glass still transmits some short " ultra-violet " rays.

From the botanical point of view the important point is that the observed differences in the plants have been recorded using solarized glass.

CONCLUSION.

The effect of growing common plants under glass transmitting ultra-violet light appears to vary with the species. In several instances, with carrots, radishes and other root crops an increased crop, infrequently amounting to more than 10 per cent., had been obtained. An increased ratio of root/shoot has been obtained. With lettuce contradictory results have been obtained at different centres, but no great increased yields have been observed. With other crops a slightly reduced yield has been reported, and slight leaf scorching observed.

In many instances the temperature under the Vita glass has been higher than under ordinary glass, due partly, if not entirely, to the different thickness of the glass. Such temperature differences have no doubt been responsible for part of the observed differences in the growth of the plants.

* Since this was written Messrs. TOTTINGHAM and MOORE's work has been published (*Journ. Agr. Res.* 43, p. 133). Their photographs show that generally the visible differences between plants grown under ordinary and Vita glass are small.

The author is indebted to Mr. F. J. CHITTENDEN for the provision of the facilities enabling him to carry out these tests.

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CONTRIBUTIONS FROM THE WISLEY LABORATORY.

LX.—Further Observations on the Black Spot Disease of Roses (Diplocarpon Rosae Wolf).

By D. E. Green, M.Sc., Mycologist.

Experiments carried out with a view to discovering a method of controlling Black Spot disease of Roses were described by the writer in this Journal, vol. **56**, p. 18.

The first part of these experiments showed that heavy dressings of artificial manures (superphosphate, sulphate of potash and sulphate of ammonia), either applied separately or together as a combined manure, did not confer on the bushes (variety 'Juliet') any special resistance against the attacks of the Black Spot fungus.

The second part of the work was an attempt to control the disease by the use of fungicides, and the best result was obtained with Bordeaux mixture (4–4–50 formula) with Saponin added (1 oz. to 50 gals. of spray). The plants were sprayed six times between June 26 and September 24, 1930. During this experiment the Bordeaux-sprayed bushes were the only ones that retained their foliage until the end of the season. This demonstrated the efficiency of the spray in some respects, despite the fact that a count of the leaves showed 43 per cent. of them infected with Black Spot. Spraying and dusting other rows with three different sprays and one dust failed to prevent them from being defoliated as severely as untreated (control) rows. (Burgundy mixture especially caused defoliation by its injurious effect on the foliage.)

The bushes used in these experiments remained undisturbed until the spring of 1931, when they were pruned according to the usual practice. As soon as they began to make growth a striking difference in their appearance was evident. This was seen in the heavy and abundant foliage produced by the row of bushes sprayed in 1930 with Bordeaux, as shown in the illustration (fig. 45). This row stood out in marked contrast to the other eight rows, none of which could compare with it in health and vigour.

These bushes have, in previous years, been badly defoliated by the Black Spot disease, but this spring the contrast described clearly showed the beneficial effect obtained with one season's treatment with Bordeaux mixture.

It should be noted that the advantage was lost and defoliation of the Bordeaux row again took place in 1931, but this was to be expected, as no further spraying was done on the row this year, and it was flanked by eight other rows all severely infected with Black Spot.

Observations on the Relative Susceptibility of certain Varieties of Roses to the Black Spot Disease.

For the past three seasons the writer has made observations and records on the varieties of roses growing in the trial grounds at Wisley, with a view to arriving at some idea of the relative severity of attack by the Black Spot fungus on these varieties under the conditions of soil and climate at Wisley.

Data have been collected from about 350 varieties, each of which is represented by a group of from three to six bushes in the trial ground. Climbing varieties of the Wichuraiana group are not included in these notes, owing to the fact that, speaking generally, they are not severely attacked by Black Spot. Polyantha varieties are also fairly resistant, and two seasons' observations on these varieties indicate that, with one or two exceptions, they do not become infected to any serious extent.

The soil is a light silty sand, and the bushes receive annual applications of farmyard and other manures. Black Spot is always present to a greater or less degree, according to the season.

There is a seasonal variation of the disease which, as the data show, is reflected in certain varieties. That there is also a constitutional resistance on the part of certain varieties is indicated by the fact that they remain almost free from the disease in seasons favourable to the fungus when adjoining bushes are heavily infected. It may here be stated that, although certain varieties appear to be very resistant, not one has yet been observed to be completely immune.

The records have been taken each year towards the end of September, when it may be assumed that the disease present on any tree can be identified as such. The results are given in the appended list under the following headings:

Almost Free.—Varieties which throughout the period of observation have remained almost free from the disease.

Slight.—Varieties which have never exhibited more than a slight attack.

Medium.—Varieties which have had most of the leaves spotted but very little defoliation.

Heavy.—Badly infected varieties with obvious defoliation.

In addition, the factor of seasonal variation necessitates additional columns for varieties which have displayed different degrees of infection in different seasons, and these are to be found under the headings almost free to slight, slight to medium, etc.

It must be remembered that the observations apply to these varieties when growing under the Wisley conditions of soil and climate. It is possible that under the conditions of other localities many varieties, which are here severely attacked, may display a greater degree of resistance. In the writer's opinion, however, those which have resisted the disease at Wisley, where the presence of susceptible varieties

maintains an ever-present source of infection, are not likely to be severely attacked elsewhere.

The author's thanks are due to the Director of the Gardens for facilities for carrying out this work, and to Mr. M. A. H. Tincker and Mr. F. C. Brown for advice and assistance.

The writer would appreciate particulars of any observations concerning this attack upon Roses, with details of variety and locality.

APPENDIX.

VARIETIES WHICH HAVE SHOWN UNVARYING DEGREES OF INFECTION DURING THE PERIOD OF OBSERVATION.

Almost Free.

'Betty Uprichard'
'Dame Edith Helen'
'Dance'
'Edith Nellie Perkins'
'Ethel Somerset'
'Etoile de Feu'
'Etoile de Hollande'
'Eugene Transon'
'H. Chaubert'
'J. C. Thornton'
'Joyous Cavalier'
'Kootenay'
'Lady Alice Stanley'
'Mabel Jackson'
'Max Vogel'
'Mme. Henri Gravereaux'
'Mrs. H. D. Green'
'Mrs. R. B. Malory'
'Nona'
'Pink Delight'
'Regina de Alvear'
'Shot Silk'
'Souvenir de Mme. Boullet'

Slight.

'Adonis'
'Augustus Hartmann'
'Baroness van Tuyll'
'Bessie Chaplin'
'Beulah'
'Bonaccord'
'Candeur Lyonnaise'
'Capt. F. Bald'
'Charming'
'Col. Oswald Fitzgerald'
'Countess of Devonport'
'Dora Stober'
'Doris Dickson'
'Dr. J. G. Fraser'
'Duke of Normandy'
'Earl Haig'
'Eldorado'
'Elsie Beckwith'
'Francie Simms'
'Frances Gaunt'
'Frau Gerda Helmus'
'George Dakin'

Slight (continued).

'George Waud'
'Innocence'
'Irish Fireflame'
'Ivy Evans'
'J. G. Glassford'
'John Hart'
'Kaiserin Augusta Victoria'
'Lady Inchquin'
'Lady Battersea'
'La France'
'Lamia'
'Lochnagar'
'Maman Cochet'
'Mary Merryweather'
'Miss Lolita Armour'
'Mme. Alexandra Dreux'
'Mme. Abel Chatenay'
'Mme. Butterfly'
'Mme. Leon Guinnotte'
'Mme. Leon Pain'
'Mevrow Natalie Nypels'
'Mrs. C. A. Wheatcroft'
'Mrs. J. Heath'
'Mrs. James Shearer'
'Mrs. H. Stevens'
'Mrs. H. Townsend'
'Mrs. T. Smith'
'Old Gold'
'Peggy Hughes'
'Pink Pearl'
'President Cherioux'
'René André'
'Richmond'
'Rev. Dr. Williamson'
'Scarlet Bedder'
'Scarlet Glory'
'The Doctor'
'Vesuvius'
'Vicomtesse Pierre du Fou'
'Violet Parncutt'
'Waltham Crimson'

Medium.

'Cheerful'
'Daisy'
'Donald McDonald'
'Ethel James'

Medium (continued).

'Evelyn Murland'
'Fancy Free'
'Frank Neave'
'Gela Gnau'
'Gorgeous'
'Gwyneth Jones'
'Gwynne Carr'
'Henrietta'
'Henriette Tersteeg'
'Hera'
'Irene Brightman'
'Isobel'
'James Walley'
'Lady Ashtown'
'Lady Florence Strong'
'Lady Helen Maglona'
'La Somme'
'Los Angeles'
'Lucile Barker'
'Lulu'
'Midas'
'Molly Sharman Crawford'
'Mrs. Alfred Tait'
'Mrs. C. E. Pearson'
'Mrs. Edmond Gillet'
'Mrs. J. Heath'
'Primrose'
'Reims'
'Rosabel Walker'
'Sir David Davies'
'Sunburst'
'T. F. Crozier'

Medium (continued).

'Toby'
'Vanity Fair'
'W. E. Wallace'
'Wm. F. Dreer'

Heavy.

'Abol'
'Admiration'
'Agnes Roggen'
'Autocrat'
'Baroness S. H. W. van Dedem'
'Dorothy Douglas'
'Emile Charles'
'Frau Felix Tonnar'
'Hilda Stewart'
'Hon. Charlotte Knollys'
'Ivy May'
'Joan Howarth'
'John Henry'
'John Russell'
'Lady Elphinstone'
'Lady Love'
'Lady Venables Vernon'
'Louise Breslau'
'Madame Jules Bouche'
'Marcia Stanhope'
'Mary Murray'
'Miss Delaval Astley'
'Muriel Wilson'
'Portadown'
'Premier'
'Venus'

VARIETIES WHICH HAVE SHOWN VARYING DEGREES OF INFECTION DURING THE PERIOD OF OBSERVATION.

Almost Free to Slight.

'America'
'Argyll'
'Caroline Testout'
'Edith Cavell'
'Frau Karl Druschki'
'General Smuts'
'Glowworm'
'Hawlmark Crimson'
'Irish Elegance'
'Joanna Bridge'
'K. of K.'
'Lady Godiva'
'Lady Maureen Stewart'
'Lady Verey'
'La Tosca'
'Leslie Evans'
'Lilly Jung'
'Lord Fairfax'
'Ma Fiancée'
'Melody'
'Merrow V. C.'
'Minnie Saunders'
'Mrs. C. W. Edwards'
'Miss Dorothy Mocatta'
'Mrs. Beckwith'
'Mrs. Hornby Lewis'
'Mrs. Talbot O'Farrell'
'Mrs. Wemyss Quin'
'Pax'

Almost Free to Slight (continued).

'Penelope'
'Red Cross'
'Red Letter Day'
'Richard E. West.'
'Souv. de Claudius Denoyel'
'Souv. de Georges Pernet'
'Souv. de L. Malmaison'

Almost Free to Medium.

'Aphrodite'
'Coronation'
'George Dickson'
'Gwen Nash'
'Henry Nevard'
'Hugh Dickson'
'Lady Dixon'
'Marie Dot'
'Rouge Angevine'
'Sir Walter Raleigh'
'Sunny Jersey'
'Sybil Pease'
'Victor Waddilove'
'W. C. Gaunt'

Almost Free to Heavy.

'Dainty Bess'
'Golden Emblem'
'Jean Forestier'
'Maud Cuming'

Slight to Medium.

'Alfred Cook'
'Ariel'
'Aspirant Marcel Rouyer'
'Barbara Robinson'
'Betty'
'Betty Hulton'
'Britannia'
'Capt. F. S. Harvey Cant'
'Christine'
'Chrissie Mackellar'
'Clarice Goodacre'
'Columbia'
'Countess of Elgin'
'Coquette'
'Crusader'
'C. V. Howarth'
'Diadem'
'Empire Queen'
'Evrard Ketten'
'Frank Reader'
'George Howarth'
'General MacArthur'
'H. V. Machin'
'Hypatia'
'Insulinde'
'Jessie'
'Joseph Guy'
'Laddie'
'Lady Hillingdon'
'Lady Pirrie'
'Lieut. Chaure'
'Mabel Morse'
'Margaret Dickson'
'Margaret Horton'
'Marjorie Bulkeley'
'Mme. Edouard Herriot'
'Mme. Ravary'
'Mrs. A. R. Barraclough'
'Mrs. Cornwallis West'
'Mrs. Frank J. Usher'
'Mrs. Henry Winnett'
'Mrs. John Laing'
'Mrs. S. Paton'
'Mrs. Wm. C. Egan'
'Pharisaer'
'Pius XI'
'President Poincaré'
'Prince Henry'
'Princes Seedling'
'Queen Alexandra'
'Rosemary'
'Saltaire'
'Souv. de Claudius Pernet'
'Souv. de George Beckwith'
'Sunstar'
'Toison d'Or'

Slight to Heavy.

'Edward Bohane'
'Geisha'

Slight to Heavy (continued).

'June Boyd'
'Kathleen Harrop'
'La Champagne'
'Lady Martha Bruce'
'Lady Plymouth'
'Lady Worthington Evans'
'Madame Melanie Soupert'
'Miss Anna Marie Bally'
'Miss Willmot'
'Mrs. Bryce Allan'
'Mrs. C. W. Dunbar Buller'
'Mrs. Dunlop Best'
'Mrs. Henry Balfour'
'Mrs. Theodore Solversen'
'Ophelia'
'Rose Berkeley McGredy'
'White Ensign'
'Yellow Bedder'
'Zephyrine Drouhin'

Medium to Heavy.

'Amelie de Bethune'
'Amelie Gravereaux'
'Angele Pernet'
'Blossom'
'Doris Trayler'
'Dr. A. I. Petyt'
'Eugene Barbier'
'Felix Dykkins'
'Fred J. Harrison'
'Goiland Beauty'
'Goiland Glory'
'Gulnare'
'Independence Day'
'Jersey Bedder'
'Janet'
'J. O. Thilow'
'Lady Margaret Stewart'
'League of Nations'
'Luna'
'Manon'
'Maria Reid'
'Molly Bligh'
'Mrs. C. W. Edwards'
'Mrs. C. V. Howarth'
'Mrs. Henry Bowles'
'Mrs. H. Morse'
'Mrs. Phyllis Eaton'
'Mrs. R. B. McClennan'
'Mrs. Redford'
'Primrose Pirrie'
'Prince of Wales'
'Queenie Robinson'
'Royal Red'
'Silverscent'
'Souv. de Capitaine Fernand Japy'
'Una Wallace'

CONTRIBUTIONS FROM THE WISLEY LABORATORY.

LXI.—Note on the Disease Resistance shown by Butcher's Disease Resister Cucumber to Cercospora Leaf Spot.

By D. E. Green, M.Sc., Mycologist.

The leaf spot disease of cucumber and melon plants (fig. 46) caused by the fungus *Cercospora Melonis* has already been referred to and the symptoms described by the writer in a previous article.* As the disease is one which quickly destroys the plants, growers were advised to keep a lookout for any sign of it. The brief history there given recorded that in the early part of this century considerable damage was done by the disease and that the introduction of the variety known as Butcher's Disease Resister was a factor of great importance in checking the trouble. In fact, since 1907 little has been heard of any great damage being done by this fungus.

Recently, however, there have been some records of small outbreaks, and it is possible that the disease may again increase. The rapidity with which affected crops are destroyed demands that the disease should be recognized in its early stages and steps taken to prevent its increase and spread.

The above-mentioned note contained some suggestions for treatment of affected plants or houses. Since it was written the writer has endeavoured in various ways to check the disease in a house where for some years the growing of cucumbers had proved almost impossible. As will be seen, no success was achieved with the precautions taken while using a variety of a susceptible nature, viz., Jasper Queen. For various reasons soil sterilization could not be carried out, but the following attempts at control were made :—

(1) In the first instance heavy fumigation with sulphur vaporizers did not prevent the disease or check its spread when present.

(2) The soil was then removed and the house thoroughly scrubbed with a 5 per cent. formalin solution. After being kept shut for some days fresh soil was procured and young plants put in. The disease was longer in appearing, but eventually destroyed the plants long before they had given a normal yield.

(3) In the next attempt the house was dismantled and all woodwork and glass cleaned and scrubbed with 5 per cent. formalin solution. The whole site was cleaned, the soil and supporting boards removed, new boards installed, and fresh soil put in. In the reassembled house a crop of Jasper Queen grew well, and some

* "Cercospora Leaf Spot on Cucumbers," *Gardeners' Chronicle*, Dec. 7, 1929, p. 449.

cucumbers had been cut when the first signs of the disease appeared. The plants were immediately sprayed with Liver of Sulphur (½ ounce to 1 gallon of water), and this was done on three successive days. This spraying did not check the disease and the plants were rapidly destroyed.

(4) It was then decided to test Butcher's Disease Resister. Plants of this variety were planted in the place of infected plants on one side of the house; the diseased plants of Jasper Queen were left on the other side, being about 5 feet away. The first leaves of some of the Butcher's soon showed characteristic spots which microscopic examination revealed were bearing spores of *Cercospora Melonis*, and these leaves were removed. The Butcher's continued to grow well, and their topmost leaves were soon level with and in some instances touching the badly infected Jasper Queen leaves, but no further leaf showed the slightest symptom of the disease and the plants gave a splendid crop.

In view of this and from other information there seems no reason to doubt the resisting power of the true Butcher's Disease Resister to Cercospora Leaf Spot. This season there has been a report that losses had been sustained from this disease even though Butcher's was the variety planted. It has since been discovered that the grower was mistaken in believing that he had obtained this variety.

Once present the disease is most difficult to eradicate. The simplest method is to plant Butcher's Disease Resister and thus prevent the increase of the fungus. If other precautions, such as cleaning and disinfecting the house, are regularly carried out it is probable that after a time the fungus will be eradicated and the growing of a susceptible variety again become possible.

Butcher's Disease Resister has been used this season at Wisley in some tests with the disease known as "gumming." Although the experiments can only be described as preliminary, it is very probable that the variety is also resistant to this trouble.

The parentage of Butcher's Disease Resister seems to be unknown, and any information throwing light upon it would be welcome.



FIG. 45.—RESULT OF SPRAYING ROSE 'JULIET' IN 1930, ON ITS GROWTH IN 1931.
ROW 2 WAS SPRAYED WITH BORDEAUX MIXTURE SIX TIMES IN 1930.

[*To face p.* 64.



FIG. 4.—CUCUMBER LEAF ATTACKED BY THE FUNGUS CERCOSPORA MELONIS

To face p. 65

THE AWARD OF GARDEN MERIT.—XIX.*

By F. J. CHITTENDEN, F.L.S., V.M.H.

140. DICENTRA SPECTABILIS.

Award of Garden Merit, February 27, 1927.

Like a good many other eastern plants, *Dicentra spectabilis* was introduced to our gardens from China. The plant had been known to European botanists for a long time. LINNAEUS named it *Fumaria spectabilis* in 1769, though he knew it before, and in the same year GMELIN wrote of it "Stupendae pulchritudinis planta." Both were thus struck by its beauty, though LINNAEUS knew it only as a dried plant, and we had to wait to see it alive until ROBERT FORTUNE, collecting for our Society, saw it, as he tells us, "in the 'Grotto Garden' on the island of Chusan, growing amongst artificial rocks near the beautiful *Weigela rosea*" and brought it back with him to be grown at Chiswick in 1846. It flowered there under glass, and a coloured drawing by Miss DRAKE was reproduced in our JOURNAL, vol. 2 (1847).

FORTUNE prophesied that the plant would be hardy, and so it proved, and now it is nearly as well known as it is beautiful. It is perennial and readily increased by division and by cuttings of the shoots in summer. It grows rapidly in spring and its racemes of many showy flowers, about an inch across, hanging from the arching stems, 18 inches high, make it as beautiful a plant as any the garden can show. The flowers, too, are striking for their shape, for the two large pouched petals together take the form of a heart, with narrow purple-tipped white petals projecting from their pointed ends. A moist soil with a certain amount of decaying vegetable matter suits it, and it is best planted where cold winds are not liable to reach it. It makes a good greenhouse plant too, forcing well along with such plants as *Astilbe japonica*.

Dicentra spectabilis is much grown in Japan and is native in Northern China, and, like most plants, it has received several names at the hands of different botanists. Two have already been mentioned; *Capnorchis spectabilis*, *Eucapnos spectabilis*, and *Corydalis spectabilis* are rarely met with; but probably *Dielytra spectabilis* and its variant *Diclytra spectabilis* are names even better known than the proper name which heads this article. Figures, too, of the plant there have

* The notes on the first hundred plants to receive the Award of Garden Merit, which appeared in the JOURNAL, vols. **47** to **53**, have been published in pamphlet form, and may be obtained from the R.H.S. Office, Vincent Square, Westminster, S.W. 1, price 1s. For further notes see vol. **54**, pp. 218 and 423; **55**, pp. 121 and 276; and **56**, pp. 80 and 245.

been many—but none better than that in our JOURNAL—and there is also a readily accessible figure in the *Bot. Mag.*, t. 4458, under the name *Dielytra spectabilis*.

141. AGAPANTHUS UMBELLATUS MOOREANUS.

Award of Garden Merit, October 8, 1928.

It can be justly claimed for but few S. African plants that they are hardy in this country, but for *Agapanthus umbellatus Mooreanus*, so long as it is placed in a sunny spot sheltered from the north and east winds, that claim is just. Plants on the west border of the Laboratory at Wisley came through the severe winter of 1928–29 without protection and without damage, and it has flowered in that place well in summer every year for many years past.

Agapanthus umbellatus grows among rocks on Table Mountain, but it is a plant of wide distribution in S. Africa, from the coastal region and Natal to the Transvaal and Orange Free State, and occurs up to 4,000 feet in some districts. Like most plants of wide distribution it has produced many varieties and several of these have been given specific names, as this, for instance, *A. Mooreanus*, but they are apparently connected by intermediates and therefore best regarded as varieties of one variable species. *A. umbellatus Mooreanus* differs from the form commonly grown in tubs in other characters besides its greater hardiness. Its foliage is narrower, more upright, and shorter, approaching the *A. minor* of Loddiges' Botanical Cabinet in this, but its dark blue flowers are as large as the commoner type. The foliage dies down to the ground in very severe weather, and the general height of the plant in summer is about eighteen inches. It is best planted in the sun in fairly stiff soil, which must be well drained, and if it contains some leaf mould so much the better. When once planted it is best left alone for some years, for the fleshy roots spread rather widely and are easily damaged. It is easily propagated by pieces taken from the side of the plant.

142. ERICA CINEREA ROSEA.

Award of Garden Merit, July 30, 1928.

Erica cinerea is one of the two common British heaths, *E. Tetralix* being the other. Both grow on most lime-free sandy commons and moors, the former in the drier, the latter in the moister parts. Occasionally *E. cinerea* forms an almost pure growth, except for a small amount of ling (*Calluna vulgaris*), and a brilliant display of crimson-purple covers the ground, as on Wisley Common, from mid-July to September. *E. cinerea* grows well on sandy peat in the heath garden, and keeps fairly close to the ground, but not all its colour forms are equally easy to grow, the deeper-coloured varieties being the most recalcitrant as a rule. *E. cinerea rosea*, however, the variety to which the award is made, and the colour of which is accurately

described in the name, is as easy to cultivate as the type. It is one of the heaths that must have lime-free soil, is best planted in March, and must have a place in the sun if it is to be really well suited.

143. CAMPANULA PORTENSCHLAGIANA.

Award of Garden Merit, July 4, 1927.

Campanula garganica, which was the subject of one of these notes (see JOURNAL, R.H.S., **56**, p. 246), grows well in Italy and a little further east, and then its place is taken in Eastern Dalmatia on rocks and walls by *C. Portenschlagiana*. While there are many more difficult Campanulas to grow than *C. Portenschlagiana* there is none more worthy a place in English gardens for all such situations as *C. garganica* can occupy. The rock garden and bank and the dry wall are the most suitable places for it, and there the strong tufts of deep green usually smooth heart-shaped leaves quickly establish themselves. In summer every one of the many shoots of which the tuft is composed produces several deep-blue flowers, funnel-shaped but for their expanded petals, thrusting them just beyond the leaves which are almost completely hidden when the flowering is at its height.

It was figured in the *Botanical Register*, **23**, t. 1995, soon after the picture of *C. garganica* appeared, at a time when many European rock plants were finding their way into English gardens.

C. Portenschlagiana thrives in quite ordinary soil so long as it is well drained, whether it contains lime or not, and is readily increased by pulling the clumps to pieces and planting the rooted growths.

It is still called *C. muralis* in catalogues, and a few named forms have been offered.

144. CAMPANULA PERSICIFOLIA 'TELHAM BEAUTY.'

Award of Garden Merit, July 30, 1928.

Campanula persicifolia is fairly widespread as a wild plant and has established itself in some parts of this country, but perhaps its chief home is in Dalmatia, like *C. Portenschlagiana*. Like that it is perennial, and easy to accommodate, but in habit it is totally distinct, for from a rosette of rather long leaves in summer grow erect flowering stems 24 to 30 inches high, bearing many well-spaced, saucer-shaped flowers of various shades of blue or even of white. Any well-drained soil suits it and it may be raised quite readily from seed or multiplied by division.

It was introduced long since, but the single forms were almost lost to cultivation because double ones had been produced and had found greater favour. The double varieties are certainly showy and the flowers last well, but they are rather clumsy compared with the single.

The variety on which the Award of Garden Merit is bestowed, 'Telham Beauty,' differs from the typical single form only in its much larger size; the flowers which are quite as freely produced are at least twice as large. Typically the variety has clear china-blue flowers, but seedlings from it (which repeat the size of the flowers) have given

white forms as well. Although larger, the flowers have lost nothing of their beauty and grace of form ; there is no suggestion of coarseness about them. The plants themselves are taller and stronger in growth than those of the ordinary form.

C. persicifolia may be grown with propriety on the large rock garden or on a dry wall, but *C. persicifolia* ' Telham Beauty ' is a border plant, and worthy of a place on any good border.

Several varieties of *C. persicifolia* have been described, among them a variety *major* and a variety *maxima*.

C. persicifolia var. *maxima* is figured in the *Botanical Magazine* t. 1798, and that figure drawn so long ago depicts a plant with flowers scarcely inferior in size to those of ' Telham Beauty.'

145. Aster Amellus ' King George.'
Award of Garden Merit, February 9, 1931.

146. Aster Amellus ' Sonia.'
Award of Garden Merit, February 9, 1931.

Although *Aster Amellus* has been grown in England since Elizabethan times, coming here from Italy, it has only recently given rise to many varieties, perhaps because few took the trouble to sow seed. The taller *A. Amellus bessarabicus* from further east was grown and valued, but that is all. The varieties available now are many and good. Almost all are worth growing, as is the wild plant, but the pick of them are the two named at the head of this note.

The varieties of *A. Amellus* are easy to grow in well-drained soil in the sun, and are easy to increase by division, but plants are often lost through being moved in autumn. They are best divided and transplanted in spring just as growth begins, and there need be no losses if treated so.

Both varieties grow to about two feet in height and are good for the front of the border ; both have stiff stems with need for only a minimum of staking ; and both have lasting flowers good for cutting.

Aster Amellus ' King George ' received an Award of Merit when shown by Mr. Perry of Enfield in 1914, and later a First-Class Certificate. It is now grown to a very considerable extent for market and is well adapted for that purpose. It flowers in August and the flowering continues well into September. The large blue flowers, nearly 3 inches across with a yellow disc, are very striking indeed.

Aster Amellus ' Sonia ' is a later comer and a later bloomer, being at its best in the first half of September, continuing into October. It was raised by Mr. Bones of Cheshunt, received the Award of Merit in October, 1928, and the First-Class Certificate when under trial at Wisley. Its flowers are bright amaranth pink and between 2 and 3 inches in diameter.

Both varieties are covered completely by flowers during their long season of bloom.

147. OLEARIA HAASTII.

Award of Garden Merit, October 8, 1928.

Comparatively few New Zealand shrubs can be depended upon to put up with our winter climate with all its fluctuations between moderate summer temperatures and icy cold, its long dull periods and its occasional equally long bright spells with temperatures below freezing, with or without snow. *Olearia Haastii* is an exception.

Messrs. VEITCH of Exeter introduced the plant to England in 1858, and there has rarely been cause to complain of any serious damage to it since, although once or twice it has been cut back rather severely, only to grow again from the base.

It seems to be a rare plant in its native land, where it is found here and there in mountainous parts of the South Island at elevations between 1500 and 4500 feet.

Olearia Haastii makes a shapely bush of rather slow growth, eventually about 4 feet high and wide, though in mild districts it may grow somewhat larger.

Its short-stalked evergreen leaves are crowded on the hoary shoots. They are small for the genus, being only ½ inch to 1 inch long, oval or ovate, with rounded ends, dark shining green on the upper surface, covered with a felt of white hairs below.

The flowers, like small white Asters, each with about four rays, are produced in corymbs from the leaf axils on stalks which thrust them out beyond the leaves, so that a well-flowered bush will be a mound of white from early July onwards. The shrub is very useful therefore for its flowering season, as well as for its evergreen character. If the fluffy brown pappus which the fruits bear is thought objectionable it can be removed, otherwise it will persist through the winter.

It may be pruned in April if necessary to keep the shape of the bush, and it is readily increased by cuttings.

Choice of soils offers no difficulty so long as drainage is good. The bush will put up with shade, but there it merely exists. Sunny exposure suits it best. It is particularly good near the sea, and is a good town plant.

BEARDED IRISES TRIED AT WISLEY, 1931.

THE Report on the Bearded Iris Trials at Wisley in our last volume (R.H.S. JOURNAL, **56**, pp. 85–96) gave a list of varieties which had received awards in the present series of trials and, taken in conjunction with the reports in earlier volumes (**53**, pp. 116–160 and **55**, pp. 132–140), indicated the position of all varieties tried since these trials were initiated.

That report also explained the system of arranging the trial and of judging the results.

The present report shows the judgments of 1931 and the acquisitions of new varieties, so bringing the matter up to date.

The varieties now described for the first time have qualified for inclusion in the Standard Collection.

The Classification followed has already been fully explained in vol. **47**, p. 6, and is followed below.

AWARDS, DESCRIPTIONS, AND NOTES.

CLASS I. WHITE OR NEARLY WHITE VARIETIES.

Kashmir White, A.M. 1931.—For description see R.H.S. JOURNAL, **53**, p. 119.

The following varieties have been added for future judgment:

DELAROCHE (Cayeux et le Clerc).
MODESTIE (Cayeux et le Clerc).
WHITE AND GOLD (Nicholls).
WHITE STAR (Nicholls).
ZADA (Emigholz).

CLASS II A *b* (2).

The following variety has been added for future judgment:

JANE AUSTIN (Insole).

CLASS II *b*.

King Karl, A.M. 1931.—For description see R.H.S. JOURNAL, **55**, p. 133.

The following variety has been added for future judgment:

BLUE OPAL (Burton).

CLASS III *b*.

The following varieties have been added for future judgment:

GRANNY (G. P. Baker).
YVES LASSAILLY (Cayeux et le Clerc).

The following variety has been relegated to the General Collection:

ETOILE DU MATIN: 24–26 inches; June.

CLASS IV *a*.

Juanita, A.M. 1931.—Vigorous but slow of increase, with spreading foliage, drooping at tips, 20–24 inches high. Flower stems 48 inches, erect, zigzag, 8-flowered, branches short. Flowers close, large, well-proportioned, stiff. Standards domed, 2⅞ × 2½ inches, lavender-violet. Falls straight-hanging, 2 × 2½ inches, bright lavender-violet with a rosy shade, veins brownish on haft. Beard white with orange tips. Flowering for 5 weeks from June 4. Raised by Mr. B. H. Farr of Wyomissing and sent by The Orpington Nursery Co. Introduced 1909.

AUTOCRAT.—Vigorous and of rapid increase, with erect foliage 20 inches high. Flower stems 28–30 inches, erect, zigzag, with short branches about middle of stem, 6- to 8-flowered. Flower of fair proportions, and medium size. Standards cupped, erect and arching, 2¼ × 1 7/16 inch, pale lavender, greyish towards haft. Falls horizontal or slightly drooping, 1¾ × 1¾ inch, violet with almost white margins, distinctly veined at base and haft. Beard white tipped lemon. Flowering for three weeks from May 28. Raised by Mrs. F. E. Cleveland, Eatontown, U.S.A., and sent by The Orpington Nursery Co. Introduced 1920.

SIMONE VAISSIÈRE.—Vigorous and of rapid increase, with erect foliage 20 inches high. Flower stems 38 inches, erect, with fairly long branches about the middle of the stem, bearing 9 closely spaced flowers. Standards domed, 2½ × 2 inches, silvery lavender with paler margins. Falls drooping, 2½ × 2½ inches, pale lavender-violet with paler margins. Beard white tipped orange. Raised by Messrs. Millet et Fils, Bourg-la-Reine, Seine, France. Sent by Mr. B. R. Long.

The following varieties have been added for future judgment:

AZYIADÉ (Cayeux et le Clerc).
CLÉMENT DUBUFFE (Cayeux et le Clerc).
DÉESSE (Cayeux et le Clerc).
MARC AUREAU (Cayeux et le Clerc).
PAPILLON (Cayeux et le Clerc).
PHOCÉE (Cayeux et le Clerc).
RENÉ CAYEUX (Cayeux et le Clerc).
SALOMÉ (Cayeux et le Clerc).
SURAYA (G. P. Baker).
VANLO (Cayeux et le Clerc).

The following varieties have been relegated to the General Collection:

ALVARES: 24 inches; June.
DAMASCUS: 40 inches; June.
MAGNIFICENT: 34 inches; June.

CLASS IV *b*.

Duke of Bedford, A.M. 1931.—For description see R.H.S. JOURNAL, **58**, p. 130.

Sirius, A.M. 1931.—Vigorous and of rapid increase, foliage erect, 22 inches high. Flower stems 38 inches, with 8 flowers rather closely placed, branches of medium length. Flower large, well proportioned, stiff. Standards domed, slightly waved at margin, 3 × 2¾ inches, bright lavender-blue. Falls hanging straight, 2¾ × 2¾ inches, rich violet-purple. Beard blue tipped orange. Flowering for fifteen days from June 3. Raised and sent by Messrs. Bunyard of Maidstone. Introduced 1923.

CUPAVO.—Of rapid increase and vigorous, with foliage 24 inches high, erect, bright glaucous green. Flower stems 40 inches, erect, zigzag, with medium length branches, 8- to 10-flowered. Flowers very large, well proportioned. Standards domed, notched, waved at margin, 3¾ × 2¼ inches, clear lavender-violet. Falls hanging straight, pinched at middle, 2¾ × 2¾ inches, rich bright violet, paler at margin. Beard white, tipped yellow and bronze. Flowering for fifteen days from June 5. Raised by Mr. W. R. Dykes, sent by Mrs. Dykes. Introduced 1927.

WISCONSIN.—Vigorous and of rapid increase, with erect foliage 24 inches high. Flower stems 38 inches, erect, 6-flowered, branches short. Flowers large, well proportioned, but floppy. Standards domed, nipped in middle, floppy, 2¾ × 2¾ inches, rich deep violet-blue. Falls straight-hanging, 2¼ × 2¼ inches, rich deep velvety nigrosin purple. Beard orange in upper half. Flowering from May 29. Sent by Messrs. Bath.

The following varieties have been added for future judgment:

DESDEMONA (Hort).
FLORIAN (Cayeux et le Clerc).
MAROTTE (Cayeux et le Clerc).
VÉRONIQUE (Cayeux et le Clerc).

CLASS IV *c*.

The following varieties have been added for future judgment:

FRAGONARD (Cayeux et le Clerc).
LUCIANE (Cayeux et le Clerc).
MARJORIE (Stern).
NÊNE (Cayeux et le Clerc).
NUMA ROUMESTAN (Cayeux et le Clerc).
THAÏS (Cayeux et le Clerc).

The following varieties are now relegated to the General Collection:

DAINTY MAID: 42 inches; May–June.
FERONIA: 40 inches; May–June.
MRS. E. B. LARGE: 36 inches; May–June.

CLASS IV *d*.

The following varieties have been added for future judgment:

ANTONIO (Hort).
NADIA (Cayeux et le Clerc).
PAVANE (Cayeux et le Clerc).

CLASS V *a*.

Realm, F.C.C. 1931.—Vigorous and of rapid increase, with erect foliage 24 inches high. Flower stems 38 inches, zigzag, with short branches, 8-flowered. Flower large, of beautiful form, stiff. Standards domed, waved at margin, 3½ × 2½ inches, lavender-blue. Falls straight-hanging, 2½ × 2¾ inches, rich lavender-blue. Beard white, tipped orange. A fine plant near *pallida odoratissima* in colour. Flowering for three weeks from June 1. Raised and sent by Mr. G. P. Baker.

Aline, A.M. 1931.—Habit of last but stem straight with long branches, 7-flowered. Flower well proportioned, very large, stiff, strongly scented. Standards domed, 3 × 2¾ inches, soft lavender. Falls hanging straight, 2¾ × 2½ inches, soft lavender with a rosy tint. Beard white, tipped yellow. Flowering for three weeks from June 3. Raised and sent by Mr. F. C. Stern.

Ariel, A.M. 1931.—For description see R.H.S. JOURNAL, **55**, p. 136.

Mlle. Schwartz, A.M. 1931.—For description see R.H.S. JOURNAL, **53**, p. 136.

Santa Barbara, A.M. 1931.—Of slow increase, with erect foliage 22 to 26 inches high. Flower stems 42 inches high, 6-flowered, branches of medium length. Flowers very large, well proportioned, stiff. Standards domed, 3½ × 2½ inches, soft clear lavender. Falls 2½ × 2¾ inches, drooping, clear soft rosy lavender. Beard white, tipped yellow. Flowering for three weeks from June 2. Raised by Mr. W. Mohr, Berkeley, California, sent by Mr. C. Salbach. *I. mesopotamica* × Kashmir White (2nd generation). Introduced 1925

The following varieties have been added for future judgment:

AMANULLAH (Dykes).
ANNE MARIE CAYEUX (Cayeux et le Clerc).
GÉRICAULT (Cayeux et le Clerc).
GHAZI (G. P. Baker).
ISABEY (Cayeux et le Clerc).
JACQUELINE GUILLOT (Cayeux et le Clerc).
MARY BARNETT (Cumbles).
PURPLE HAZE (H. P. Sass).
RAHERE (G. P. Baker).
SENSATION (Cayeux et le Clerc).

CLASS V *b*.

The following varieties have been added for future judgment:

LA PUCELLE (Hort).
NEMO (Cayeux et le Clerc).
PETRARQUE (Cayeux et le Clerc).
ZAMPA (Cayeux et le Clerc).

CLASS V *c*.

Eglantine, A.M. 1931.—Vigorous and of rapid increase, with erect foliage 22 inches high. Flower stem 48 inches high, straight, erect, with very short branches, 6-flowered. Flowers very large, well proportioned, stiff. Standards domed, 3 × 2½ inches, lilac-mauve. Falls straight-hanging, 2½ × 2½ inches, slightly darker than standards, with brownish veins on haft. Beard white, apex yellow tipped bronze. Flowering for three weeks from June 3. Raised and sent by Miss Insole.

DOGROSE.—Habit of last, but flower stems 44 inches, with medium length branches, 8-flowered. Flowers large, stiff. Standards domed, 3 × 2¾ inches, pale pinkish mauve, fading with age. Falls straight-hanging, 2¾ × 2½ inches, pale-lilac-mauve. Beard bright orange. Flowering for fifteen days from June 5. Raised and sent by Miss Insole.

The following varieties have been added for future judgment:

FASCINATION (Cayeux et le Clerc).
ROSE MARIE (Cayeux et le Clerc).

CLASS V *d*.

The following varieties have been added for future judgment:

LABOR (Cayeux et le Clerc). MARYLISE (Cayeux et le Clerc).
MAGENTA (Cayeux et le Clerc).

CLASS VI *a* (1).

The following varieties have been added for future judgment:

CANDLELIGHT (Andrews). FRANCHEVILLE (Cayeux et le Clerc).
COROT (Cayeux et le Clerc). MARQUISETTE (Cayeux et le Clerc).
DURANDAL (Cayeux et le Clerc). OPHELIA (Cayeux et le Clerc).
FARANDOLE (Cayeux et le Clerc). SENORITA (Mohr).

The following variety has been relegated to the General Collection:

NIMBUS: 36 inches; June.

CLASS VI *a* (2).

Romance, A.M. 1931.—Vigorous and of very rapid increase, with erect foliage. 24 inches high. Flower stems 36 inches, erect, with branches of medium length, 12-flowered. Flowers of medium size, well proportioned and stiff. Standards arching, 2¾ × 2¾ inches, bright vinous mauve on yellow ground, bronzy at base. Falls drooping, 2 × 2 inches, bright vinous mauve on yellow, margins tinged bronze, and veins on haft pale brownish. Beard bright yellow. Flowering for three weeks from June 6. Raised and sent by Messrs. Murrell, the Orpington Nursery. Imperator × Shekinah. Introduced 1928.

ENION.—Foliage 22 inches, flower stems 38 inches, erect, branches short, flowers 8. Flowers large, well proportioned, stiff. Standards domed, 2¾ × 2¾ inches, soft pinkish mauve on deep cream, margins edged lilac. Falls straight-hanging, 2 × 2¼ inches, bright reddish purple with paler margins, veins brownish on haft. Beard cream tipped bronze. Raised and sent by Mr. B. R. Long. (Imperator × Olympus.)

The following varieties have been added for future judgment:

DISTINCTION (Cayeux et le Clerc). HORACE VERNET (Cayeux et le Clerc).
FANDANGO (Cayeux et le Clerc). ROXANE (Cayeux et le Clerc).

CLASS VI *b*.

Hamdoillah, A.M. 1931.—Vigorous and of rapid increase, with erect foliage, 24 inches high. Flower stems 42 inches, with long branches, 6-flowered. Flowers very large, well proportioned, stiff. Standards domed, 3¼ × 2¾ inches, dull lavender blue, smoky towards base, there suffused bronzy yellow. Falls 2¾ × 2¼ inches, drooping, rich violet-purple, brownish towards beard and on veins. Beard white, yellow above. Raised and sent by Mr. G. P. Baker. Cypriana × ?

The following varieties have been added for future judgment:

CAMBUSCAN (G. P. Baker). KILLYLEAGH (Rowan).
CASSANDRE (Cayeux et le Clerc). MARDI (G. P. Baker).
FIRE GOD (Nicholls). VICTOR HUGO (Cayeux et le Clerc).
H. CORREVON (Cayeux et le Clerc).

The following variety has been relegated to the General Collection:

STORM: 24 inches; May–June.

CLASS VI *c* (1).

Egypt, A.M. 1931.—Vigorous and free of increase, with erect foliage 30 inches high. Flower stems erect, 38 inches high with short branches, 6-flowered. Flowers very large, well proportioned, stiff, strongly scented. Standards domed, 3¼ × 2¾ inches, dull smoky pale violet with yellowish base. Falls drooping, 2¾ × 2¼ inches, velvety, rich violet-purple, with distinct veins on haft. Beard cream, tipped gold. Flowering for a fortnight from June 3. Raised and sent by Messrs. Wallace, Tunbridge Wells. Introduced 1929.

Morning Splendour, A.M. 1931.—Vigorous, of rapid increase, foliage 18 inches, erect. Flower stems erect, 32 inches, with branches of medium length, 8-flowered. Flowers large, stiff, well proportioned, strongly scented. Standards domed, 2¾ × 2¾ inches, dull smoky violet, yellowish at base. Falls straight-hanging, 2¾ × 2¼ inches, velvety, rich wine-purple. Beard bright yellow.

Flowering for a fortnight from June 5. Raised by Mr. Shull, sent by Mr. B. R. Long. Troyana × Lent A. Williamson.

REVERIE.—Vigorous, of rapid increase, foliage 24 inches, sometimes drooping at tips. Flower stems erect, 36–38 inches high, with short branches, 9-flowered. Flowers of medium size, well proportioned. Standards arching, 2¾ × 2 inches, cream with faint carmine flush, margins edged carmine. Falls straight-hanging, 1¾ × 2 inches, dull carmine purple, with veins distinct on haft. Beard pale yellow. Flowering for a fortnight from June 5. Raised and sent by Miss Sturtevant, Wellesley, U.S.A. (Hector × Shelford Chieftain) × self.

The following varieties have been added for future judgment:

DON JUAN (Cayeux et le Clerc).
GLUCK (Cayeux et le Clerc).
MADAME HENRI CAYEUX (Cayeux et le Clerc).
ROMULUS (Cayeux et le Clerc).
SANDRINE (Cayeux et le Clerc).

CLASS VI *c* (2).

The following varieties have been added for future judgment:

FROMENTIN (Cayeux et le Clerc).
GREUZE (Cayeux et le Clerc).
GUSTAVE COURBET (Cayeux et le Clerc).
LOUIS DAVID (Cayeux et le Clerc).
ROSA BONHEUR (Cayeux et le Clerc).
TROYON (Cayeux et le Clerc).

The following variety has been relegated to the General Collection:

GLAMOUR: 32–36 inches; June.

CLASS VII *b*.

The following varieties have been added for future judgment:

IROQUOIS (Cayeux et le Clerc).
J. F. MILLET (Cayeux et le Clerc).
MUSCADIN (Cayeux et le Clerc).
SEQUANA (Cayeux et le Clerc).

The following varieties have been relegated to the General Collection:

KATHRYN FRYER: 36–42 inches: June.
W. J. FRYER: 36–38 inches; June.

CLASS VII *c*.

Seraph, A.M. 1931.—Vigorous and of rapid increase, with erect foliage, 18 inches high. Flower stems erect, 32 inches high, with short branches, 6-flowered. Flowers of medium size, well proportioned, strongly scented. Standards domed, 2¼ × 1¾ inch, deep yellow ochre. Falls drooping, 2 × 1¾ inch, yellow ochre, veined brownish chestnut. Beard bright orange. Flowering for three weeks from June 3. Raised by Mrs. Murrell and sent by the Orpington Nursery Co. Sunset × Shekinah. Introduced 1929.

CLASS VII *d*.

The following varieties have been added for future judgment:

DELACROIX (Cayeux et le Clerc).
DÉTAILLE (Cayeux et le Clerc).
GIRARDON (Cayeux et le Clerc).
PAUL BAUDRY (Cayeux et le Clerc).
WATTEAU (Cayeux et le Clerc).

CLASS VIII *a*.

The following varieties have been added for future judgment:

BASTIEN LEPAGE (Cayeux et le Clerc.
NICOLAS POUSSIN (Cayeux et le Clerc).
PLUIE D'OR (Cayeux et le Clerc).

The following variety has been relegated to the General Collection:

MONTEZUMA: 26 inches; June.

CLASS VIII *b*.

DAFFODIL.—Vigorous and of rapid increase, with foliage 20 inches high. Flower stems 36 inches, erect, with short branches, 8-flowered. Flowers fairly large, well proportioned, pale cream, falls rather deeper. Standards cupped, 2¼ × 1¾ inch. Falls drooping, 2 × 1¾ inch. Beard deep yellow. Flowering for a fortnight from June 10. Raised by Mrs. Murrell, sent by the Orpington Nursery Co. Imperator × Shekinah. Introduced 1929.

DAHLIAS TRIED AT WISLEY, 1931.

THE trial of Dahlias was continued at Wisley in 1931 on the same lines as in former years, new varieties selected at Vincent Square being grown side by side with those which had received awards in the trials of the years immediately preceding. There were in all two hundred and eighty-two varieties grown at Wisley in 1931, of which sixty-one had been selected by the Joint Dahlia Committee in 1930. These made good growth on the same site as has been used for them for several years and were judged on September 2, when the awards shown below were recommended. The Joint Committee, at the request of the National Dahlia Society, selected as the best seedling of the year, to receive the Gold Medal of the Dahlia Society, Mr. WEST'S seedling 'Baby Royal.'

AWARDS, DESCRIPTIONS, AND NOTES.

Class I. SINGLE DAHLIAS.

AWARDS.

Caldicot Castle, A.M. September 2, 1931. Raised and sent by Messrs. W. Treseder of Cardiff.

Princess Margaret, H.C. September 2, 1931. Raised and sent by Messrs. J. Cheal of Crawley, Sussex.

Orange.

MRS. NEVILLE MARRIAGE (Stokes).—4 feet. Flowers of type B, 3½ to 4 inches diameter; bright rich orange; on 9- to 12-inch stalks, well above foliage; free flowering.

Scarlet.

PRINCESS MARGARET (Cheal), **H.C.**—4 feet. Flowers of type A, 3 inches diameter; scarlet, broadly tipped with creamy-yellow; on 5- to 8-inch stalks, erect, well above foliage; free flowering.

CALDICOT CASTLE (Treseder), **A.M.**—4½ feet. Flowers of type B, 3½ to 3¾ inches diameter; rich scarlet; on 6- to 12-inch stalks, well above foliage, free and erect.

Class II. MIGNON SINGLE DAHLIAS.

Yellow.

GRANT'S YELLOW (Smith).—18 inches. Flowers 3½ inches diameter; picric-yellow; on 3- to 6-inch stalks, erect, well above foliage.

Class IV. ANEMONE-FLOWERED DAHLIAS.

Crimson.

ALPHA (Dobbie).—3½ feet. Flowers inches diameter; crimson; outer rays curled, often twisted; stalks 8 to 12 inches, erect, well above foliage.

Class VI. SMALL-FLOWERED PÆONY DAHLIAS.

AWARDS.

Lycette, A.M. September 2, 1931. Raised and sent by Messrs. J. Burrell of Cambridge.

Mabel Crossling, A.M. September 2, 1931. Raised and sent by Mr. A. J. Cobb, The University, Reading.

Minnie, A.M. September 2, 1931. Raised and sent by Mr. J. Dixon, The Gardens, Brooksley Hall, nr. Leicester.

Our Mary, A.M. September 2, 1931. Raised and sent by Mr. J. Barwise, Towneley, Burnley.

Nanty, A.M. September 2, 1931. Raised and sent by Messrs. J. Burrell.

Orange Bedder, A.M. September 2, 1931. Raised and sent by Messrs. W. Treseder.

Ramon, A.M. September 2, 1931. Raised and sent by Messrs. J. Burrell.

Ayesha, H.C. September 2, 1931. Raised and sent by Messrs. W. Treseder.

Corona, H.C. September 2, 1931. Raised and sent by Mr. A. J. Cobb.

Olive, H.C. September 2, 1931. Raised and sent by Messrs. J. Burrell.

Nuan, H.C. September 2, 1931. Raised and sent by Messrs. J. Burrell.

Yellow.

LYCETTE (Burrell), **A.M.**—4 feet. Flowers 4 inches diameter; pale lemon-yellow; rays flat; very free, erect on 6- to 14-inch stalks, carried well above foliage.

WHYNNE (Burrell).—4 feet. Flowers 4 inches diameter; pale lemon-yellow shaded buff towards the disc; rays flat; free, erect on 6- to 9-inch stalks, well above foliage.

Orange.

MABEL CROSSLING (Cobb), **A.M.**—Described JOURNAL R.H.S., **56**, p. 99.

Old Gold.

AYESHA (Treseder), **H.C.**—4½ feet. Flowers 4 inches; bright old gold; rays flat, pointed; very free, erect, on 9- to 12-inch stalks, well above foliage.

Buff.

PEGGY WOOD (Wood).—3½ feet. Flowers 4 inches; yellowish-buff shading to rosy-salmon at the tips; rays flat, blunt, sparse flowering, somewhat drooping, on 9- to 12-inch stalks, above the foliage.

CORONA (Cobb), **H.C.**—4 feet. Flowers 3½ inches; orange-buff with crimson zone at the disc; rays flat, reflexed at tips; free, erect, on 6- to 10-inch stalks, well above foliage.

TEASEL (Burrell).—3½ feet. Flowers 3½ to 4 inches; salmon-buff shading to buff-pink at the tips, crimson zone around disc; rays flat, pointed; free, erect, on 6- to 9-inch stalks, above the foliage.

Pink on Yellow.

ACIS (Burrell).—5 feet. Flowers 3½ to 4 inches; pale pinkish-buff, base of rays lemon; rays channelled; free, erect, on 9- to 12-inch stalks, well above foliage.

OUR MARY (Barwise), **A.M.**—4½ feet. Flowers 3 to 3½ inches; salmon-orange shaded buff, crimson zone around disc; rays flat, inner incurved; free, erect, on 6- to 12-inch stalks, above foliage.

DILLY JAMES (Burrell).—3½ feet. Flowers 4 inches; rosy-carmine shading to rose-pink at the margins of the rays; rays channelled, pointed; free, erect, on 6- to 9-inch stalks, well above foliage.

SHOT SILK (Cheal).—3 feet. Flowers 3½ to 4 inches; rosy-carmine at margins of the rays shading to crimson, base of ray florets yellow; rays flat, blunt; free, erect, on 6- to 9-inch stalks, well above foliage.

Pink.

MINNIE (Dixon), **A.M.**—5 feet. Flowers 3½ to 4 inches; bright rose-pink; rays flat, inner recurved; very free, erect, on 6- to 12-inch stalks, well above foliage.

NANTY (Burrell), **A.M.**—4 feet. Flowers 3½ inches; bright rose; rays flat, inner channelled and incurved; free, erect, on 6- to 9-inch stalks, well above foliage.

OLIVE (Burrell), **H.C.**—3½ feet. Flowers 4 to 4½ inches; bright rose shading to bronzy-crimson at disc; rays flat, pointed; free, erect, on 6 to 10-inch stalks, well above foliage.

EDITH (Burrell).—4 feet. Flowers 3 to 4 inches; pale rose at tips of rays shading to rose-red, fades; rays curled at the margins, inner incurved; free, erect, on 6- to 12-inch stalks, well above foliage.

Orange-scarlet.

ORANGE BEDDER (Treseder), **A.M.**—4 feet. Flowers 3½ inches; orange-scarlet; rays channelled; free, erect, on 6- to 10-inch stalks, well above foliage.

VESTA (Burrell).—4 feet. Flowers 3½ inches; bright glowing orange shaded red, fades; rays flat, inner incurved; free, erect, on 6- to 12-inch stalks, well above foliage.

Scarlet.

NUAN (Burrell), **H.C.**—4½ feet. Flowers 3½ to 4 inches; bright rich scarlet, base of rays lemon; rays flat, inner channelled; very free, erect, on 6- to 9-inch stalks, well above foliage.

BABS (Burrell).—3 feet. Flowers 3½ inches; deep scarlet, fading; rays flat, pointed; free, erect, on 5- to 8-inch stalks, well above foliage.

RAMON (Burrell), **A.M.**—4 feet. Flowers 4 inches; bright rich deep scarlet, rays flat, blunt; very free, erect, on 6- to 10-inch stalks, well above foliage.

TESSA (Burrell).—3½ feet. Flowers 3½ to 4 inches; bright rich deep scarlet; rays flat; free, erect, on 6- to 12-inch stalks, above foliage.

NYDIA (Cobb).—3½ feet. Foliage purple-brown. Flowers 3 to 3½ inches; bright rich deep scarlet; rays flat, blunt; free, erect, on 6- to 9-inch stalks, well above foliage.

Purplish-crimson.

DELOS (Burrell).—4½ feet. Foliage purple-brown. Flowers 4 to 4½ inches; purplish-crimson shading to magenta at the tips of the rays; rays flat, pointed; free, erect, on 6- to 12-inch stalks, well above foliage.

Lilac.

ANITRA (Burrell).—4 feet. Flowers 3½ inches; pale silvery-lilac; rays flat; fairly free, erect, on 6- to 8-inch stalks, well above foliage.

Class VII. DWARF PÆONY-FLOWERED DAHLIAS.

Orange-scarlet.

TOWNELEY GEM (Barwise).—2½ feet. Foliage brownish. Flowers 3½ inches; orange-scarlet; free, somewhat drooping, on 4- to 6-inch stalks, well above foliage.

Class VIII. DECORATIVE DAHLIAS.

Creamy-white and Lilac.

MRS. H. BLACKMAN (Stredwick).—5 feet. Flowers 5 to 6 inches; creamy-white, tips tinged pale lilac, rays flat, pointed; free, erect, on 6- to 10-inch stalks, well above foliage.

Yellow and White.

DUCHESS (Stredwick).—6 feet. Flowers 5 to 7 inches; deep lemon-yellow, tips white; rays flat, inner recurved at margins; fairly free, erect, on 6- to 12-inch stalks, well above foliage.

Golden-buff.

LORD LAMBOURNE (Stredwick).—5 feet. Flowers 6 inches; golden-buff, base of florets lemon; rays pointed, margins recurved; free, almost erect, on 6- to 9-inch stalks, at first hidden by foliage, afterwards above.

Pink on Yellow.

KENTUCKY (Ballego).—6 feet. Flowers 6 inches; pale rose-pink on buff, lower quarter of florets pale buff; rays flat, inner channelled; free, erect, on 9- to 12-inch stalks, well above foliage.

MARQUISE D'HAUTPAUL (Walker).—6 feet. Flowers 4½ to 6 inches; coral-pink on orange; rays flat, somewhat pointed, inner channelled; free, erect, on 9- to 12-inch stalks, well above foliage.

Pink.

REV. L. HOOPER (Stredwick).—6 feet. Flowers 5 to 7 inches; rich rosy-amaranth; rays pointed, recurved at the margins; free, erect, on 6- to 10-inch stalks, at first hidden by the foliage, afterwards above.

Lilac.

W. FRANK FREEMAN (Stredwick).—5 feet. Flowers 5 to 6½ inches; pale silvery-lilac; rays flat, somewhat pointed; free, erect, on 9- to 15-inch stalks, well above foliage.

Scarlet.

HARRY HOAD (Stredwick).—5½ feet. Flowers 5 to 6½ inches; scarlet, rays flat, pointed; fairly free, erect, on 6- to 10-inch stalks, at first hidden by the foliage, afterwards above.

SCARLET GLOW (Cheal).—5 feet. Flowers 4½ to 5 inches; bright scarlet; rays flat, inner channelled; free, erect, on 9- to 15-inch stalks, well above foliage.

UGANDA (Stredwick).—4½ feet. Flowers 6 to 8 inches; deep rich scarlet, rays flat; somewhat free, erect, on 6- to 10-inch stalks, at first hidden by foliage, afterwards above.

Crimson.

ORACLE (Stredwick).—5 feet. Flowers 5 to 6 inches; rich crimson, tips white; rays flat; free, erect, on 9- to 16-inch stalks, above foliage.

PRELATE (Stredwick).—5½ feet. Flowers 5 to 6 inches; deep crimson; rays flat, inner channelled; free, erect, on 6- to 12-inch stalks, well above foliage.

ROYAL VELVET (Carlée).—5 feet. Flowers 6 to 8 inches; deep rich crimson; rays curled and twisted; free, erect, on 9- to 18-inch stalks, well above foliage.

Class IX. SMALL-FLOWERED DECORATIVE DAHLIAS.

AWARDS.

Fabian, A.M. September 2, 1931. Raised and sent by Messrs. J. Burrell.

Baby Royal, A.M. September 2, 1931. Raised and sent by Mr. J. T. West, Tower Hill, Brentwood.

Yellow.

DUSART (Cheal).—5 feet. Flowers 3 inches; bright lemon-yellow; rays flat, pointed; somewhat free, erect, on 6- to 12-inch stalks, above foliage.

Orange.

LENORE (Burrell).—3½ feet. Flowers 3 to 4 inches; bright rich orange; rays curled; very free, erect, on 6- to 12-inch stalks, well above foliage.

Buff and Salmon.

FABIAN (Burrell), **A.M.**—4½ feet. Flowers 3 to 4 inches; yellowish-buff shaded salmon-rose; rays flat, inner channelled; very free, erect, on 6- to 12-inch stalks, well above foliage.

Pink on Yellow.

BABY ROYAL (West), **A.M.**—3½ feet. Flowers 3 inches; pale rose-pink at tips shading to pale orange-buff at base of the florets; very free, erect, on 6- to 9-inch stalks, well above foliage. (Gold Medal, N.D.S., 1931.)

Pink.

PETE (Burrell).—3½ feet. Flowers 3 to 3½ inches; bright rose-pink; very free, erect, on 4- to 7-inch stalks, well above foliage.

Class X. DWARF DECORATIVE DAHLIAS.

AWARD.

Princess Elizabeth, A.M. September 2, 1931. Raised and sent by Mr. J. T. West.

Carmine.

PRINCESS ELIZABETH (West), **A.M.**—2 feet. Flowers 4 to 4½ inches; bright crimson-carmine; rays channelled, reflexed at the tips; free, erect, on 6- to 9-inch stalks, well above foliage.

Class XI. CAMELLIA-FLOWERED DAHLIAS.

AWARD.

Mrs. Charles Hay, A.M. September 2, 1931. Raised and sent by Messrs. J. Cheal.

Scarlet.

MRS. CHARLES HAY (Cheal), **A.M.**—Described R.H.S. JOURNAL, vol. **55**, p. 130.

Class XIV. STAR DAHLIAS.

Orange.

BETCHWORTH STAR (Cheal).—5 feet. Flowers 3 to 3½ inches; orange shading to lemon at the base of each floret; somewhat free, erect, on 6- to 12-inch stalks, well above foliage.

Pink on Yellow.

LEITH HILL STAR (Cheal).—4 feet. Flowers 3 inches; carmine on yellow ground, base of each floret lemon; free, erect on 6- to 10-inch stalks, well above foliage.

BOXHILL STAR (Cheal).—3½ feet. Flowers 3 inches; bright salmon-orange; free, erect, on 6- to 10-inch stalks, well above foliage.

Class XV. CACTUS DAHLIAS.

AWARDS.

Schiller, A.M. September 2, 1931. Raised and sent by Messrs. H. Carlée of Haarlem, Holland.

Doris J. Cooper, A.M. September 2, 1931. Raised and sent by Messrs. W. Treseder, Cardiff.

Yellow.

GLAMIS (Stredwick).—5½ feet. Flowers 5 to 6½ inches; pale lemon-yellow; somewhat free, drooping, on 9- to 16-inch stalks, well above foliage.

Pink on Yellow.

MRS. W. T. SMITH (Stredwick).—5 feet. Flowers 6 to 8 inches; pale rosy-amaranth shading to buff at the base of each floret; free, drooping, on 9- to 15-inch stalks, above foliage.

CONGRESS (Cheal).—4½ feet. Flowers semi-double, 4½ inches; pale lemon-yellow shading to rose-red at the tip of each floret; free, erect, on 6- to 10-inch stalks, just above foliage.

Pink.

MRS. OLAF HAMBRO (Stredwick).—7 feet. Flowers 6 to 8 inches; pale silvery rose-pink deeper towards the base of each floret, base greenish; free, erect, on 9- to 14-inch stalks, at first hidden by foliage, afterwards above.

UNICUM (Bruidegom).—5½ feet. Flowers 5 to 6 inches; soft pale rose, inner florets cream; free, erect, on 9- to 15-inch stalks, well above foliage. A garden cactus variety.

SCHILLER (Carlée), **A.M.**—4 feet. Flowers 5 to 6½ inches; bright rich salmon-pink; free, erect, on 9- to 16-inch stalks, well above foliage. A garden cactus variety.

GAIETY (Carlée).—4 feet. Flowers 5 to 6 inches; bright rosy-amaranth; free, erect, on 9- to 12-inch stalks, well above foliage. A garden cactus variety.

Terra-cotta.

TOGO (Stredwick).—7 feet. Flowers 5 to 6 inches; bright terra-cotta, base of each floret lemon; free, erect, on 9- to 15-inch stalks, well above foliage.

Yellow and Scarlet.

GALAXY (Stredwick).—5½ feet. Flowers 5 to 7 inches; deep yellow striped and speckled with scarlet; somewhat free, erect, on 9- to 12-inch stalks, well above foliage. A garden cactus variety.

Lilac.

DORIS J. COOPER (Treseder), **A.M.**—6½ feet. Flowers 5 to 6½ inches; pale lilac; free, erect, on 12- to 24-inch stalks, well above foliage. A garden cactus variety.

OLEARIA MACRODONTA.

By the kindness of Mr. Reginald Cory we are able to illustrate (fig. 47) a very finely grown plant of *Olearia macrodonta* growing at Duffryn, near Cardiff, where it flowered magnificently in June, 1931. The plant measured then 12 feet 3 inches in height and was 87 feet in circumference. It is growing in a fairly heavy soil and in a mild climate.

Olearia macrodonta, which is perhaps the finest of its genus, grows wild in the mountainous parts of New Zealand in both Islands and reaches to an altitude of 4,000 feet. It has therefore a wide range, and this no doubt accounts for its relative hardiness. Its leaves are large and coarsely toothed, green above and densely clothed with white hair below; its flowers are white and borne in large rounded corymbs about 5 inches across. It is altogether a very fine plant.

RODGERSIA PINNATA.

From the same garden, Duffryn, comes a photograph (fig. 48) of a fine group of seedlings of the Chinese *Rodgersia pinnata* in full flower. *R. pinnata* grows wild in shady places by water in Yunnan, and is best accommodated in a similar situation in our gardens, for there its fine leaves attain their full size and its plumes of white flowers reach their full beauty. Nearly allied to the Astilbes, and differing from them mainly in the structure of their leaves, the Rodgersias are fine companions for them in similar damp situations, the only trouble arising, as with some of the Astilbes, from their tendency to grow a little too early in the year, and so be damaged by spring frosts.



FIG 47.—OLEARIA MACRODONTA AT DUFFRYN.

[*To face p.* 80.



FIG 48 —RODGERSIA PINNATA AT DUFFRYN

(p 80

NARCISSI AT WISLEY, 1928–31.

As explained in the last Report on Narcissi tried at Wisley (see R.H.S. JOURNAL, **53**, pp. 376–391), awards are now made by the Council to varieties suited for general cultivation in the open garden only after trial at Wisley. This system was started for Narcissi in 1924, and this is the second list of varieties tried and awards made after trial.

As already pointed out, the Awards are recommended after the appointed Judges (who frequently examine the trials) have convinced themselves not only of the good proportions and colouring of the flowers, but also of the freedom of flowering of the variety, its rapidity of increase, the nature of its foliage, its sturdiness, and its general " look " in the garden.

In order to make comparison easier, certain well-known varieties were selected, typical of their several classes, and planted side by side with the new varieties under trial.

A list of these varieties is given which will assist those who wish to know the standard set, as the varieties themselves have assisted the Judges in forming their conclusions.

LIST OF STANDARD VARIETIES OF NARCISSI PLANTED FOR COMPARISON.

Varieties for Garden Decoration.	Market Varieties for cutting from the open.	Varieties for the Rock Garden.
	Division 1a.	
CLEOPATRA	KING ALFRED	NANUS
KING ALFRED	EMPEROR	MINOR
POTENTATE	GOLDEN SPUR	MINIMUS
	Division 1b.	
MADAME DE GRAAFF	MADAME DE GRAAFF	W. P. MILNER
MRS. ROBERT SYDENHAM	MIMI	MOSCHATUS
WHITE KNIGHT	SULPHUR BEAUTY	
	Division 1c.	
EMPRESS	EMPRESS	
WEARDALE PERFECTION	WEARDALE PERFECTION	
DUKE OF BEDFORD	SPRING GLORY	
	Division 2a.	
CRŒSUS	CRŒSUS	
HOMESPUN	SIR WATKIN	
SIR WATKIN	AUTOCRAT	
	Division 2b.	
WHITEWELL	BERNARDINO	
BERNARDINO	LADY MARGARET BOSCAWEN	
LADY MARGARET BOSCAWEN	LUCIFER	

Varieties for Garden Decoration.	Market Varieties for cutting from the open.	Varieties for the Rock Garden.
	Division 3a.	
BARRII CONSPICUUS BATH'S FLAME	BARRII CONSPICUUS BATH'S FLAME BRILLIANCY	
	Division 3b.	
SEAGULL SUNRISE ALBATROSS	LADY GODIVA SUNRISE FIRETAIL	
	Division 4a.	
LORD KITCHENER CRYSTAL QUEEN HON. MRS. J. L. FRANKLIN	LORD KITCHENER	
	Division 4b.	
QUEEN OF THE NORTH WHITE LADY EVANGELINE	QUEEN OF THE NORTH WHITE LADY EVANGELINE	
	Division 5a.	
MARIE HALL		QUEEN OF SPAIN BERYL
	Division 5b.	
VENETIA	VENETIA	DAWN
	Division 6.	
		FEBRUARY GOLD
	Division 7.	
BUTTERCUP ODORUS RUGULOSUS ODORUS RUGULOSUS MAXIMUS	BUTTERCUP ODORUS RUGULOSUS	
	Division 8.	
ADMIRATION ELVIRA ASPASIA MEDUSA CHINITA	ELVIRA ASPASIA	
	Division 9.	
POETICUS ORNATUS MAXIMUS HORACE SONATA	POETICUS ORNATUS MAXIMUS HORACE VIRGIL	
	Division 10.	
ARGENT INGLESCOMBE PRIMROSE PHŒNIX	ARGENT INGLESCOMBE PRIMROSE PHŒNIX	
	Division 11.	
		BULBOCODIUM CONSPICUUS CYCLAMINEUS TRIANDRUS ALBUS JUNCIFOLIUS

The Awards shown below are the result of examination of the growing plants over at least two (and generally more) years on several occasions while they were in bloom.

The classification followed is that of the Society's 'List of Daffodils' and the abbreviations used are as follows:

A.M. = Award of Merit.
H.C. = Highly Commended.
C. = Commended.
c. = Award given for excellence as a cut flower
g. = ,, ,, ,, ,, in the garden.
m. = ,, ,, ,, ,, as a market plant.
r. = ,, ,, ,, growing in the rock garden.

AWARDS, DESCRIPTIONS, AND NOTES.

Division 1*a*.

Self-yellow Trumpet Daffodils.

AWARDS.

Citronella, A.M. (*g.*) April 11, 1930. Raised and sent by Messrs. C. G. van Tubergen, Haarlem, Holland.

Dawson City, A.M. (*g.*) April 25, 1930. Raised and sent by Messrs. C. G. van Tubergen.

Seraphine, A.M. (*g.*) April 25, 1930. Raised and sent by Messrs. C. G. van Tubergen.

Edgar Thurston, A.M. (*g.m.*) April 10, 1931. Raised by Rev. G. H. Engleheart and sent by Mr. F. A. Secrett, Marsh Farm, Twickenham.

Grenadier, A.M. (*g.m.*) April 10, 1931. Raised by Mr. C. H. Cave and sent by Mr. Cranfield. [**H.C.** 1930.]

Condor, H.C. (*g.*) April 25, 1930. Raised and sent by Messrs. C. G. van Tubergen.

CITRONELLA (van Tubergen), **A.M.**—Stems 10 to 12 inches, stiff; flower well posed; perianth 3½ inches diameter, flat, segments overlap for half their length, somewhat irregular, creamy-sulphur; trumpet 1¾ to 2 inches wide, 1½ inch deep, spreading at the mouth, primrose-yellow. Bulb large, of medium increase; free flowering. March 28 to May 1.

SICILY (Hawker).—Vigorous; stems 15 to 18 inches, stiff; flower well posed; perianth 4½ inches diameter, flat, margins of segments incurved, segments overlap for half of their length, creamy-sulphur; trumpet 1½ inch wide, 1¼ inch deep, spreading at the mouth, pale buttercup-yellow. Bulb of medium size, of medium increase, free flowering. April 11 to May 5. Raised by Rev. G. H. Engleheart.

SIR STANLEY MAUD (Kitchen).—Vigorous; stem 15 inches; flower well posed; perianth 3½ inches diameter, segments overlap for half of their length, margins incurved, creamy-sulphur; trumpet 1¾ inch wide, 1½ inch deep, mouth expanded, rich lemon-yellow. Bulb large, of medium increase, not very free flowering. April 2 to May 1. Raised by Lieut.-Col. C. E. Kitchin.

SERAPHINE (van Tubergen), **A.M.**—Very vigorous; stem 14 inches, stiff; flower well posed; perianth 3½ inches diameter, flat, segments overlap for half of their length, regular, somewhat pointed, pale sulphur; trumpet 1½ inch deep and wide, somewhat spreading at the mouth, sulphur. Bulb large, of rapid increase, free flowering. April 7 to May 1.

TREASURE (van Tubergen).—Vigorous; stem 18 inches; flower inclined to droop; perianth 3½ inches diameter, flat, segments overlap for half of their length, bright sulphur; corona 1½ inch deep, sulphur-yellow, mouth somewhat expanded and frilled. Bulb large, of medium increase, very free flowering. April 2 to April 28. Raised by sender.

DUDDINGSTON (Dobbie).—Vigorous; stem 18 to 21 inches, stiff; flower well posed; perianth 3½ inches diameter, segments overlap for half of their length, margins incurved, sulphur; trumpet 1½ inch wide, 1½ inch deep, mouth somewhat expanded, pale buttercup-yellow. Bulb large, slow of increase, not very free flowering. April 11 to May 5. Raised by Mr. W. B. Cuthbertson. ('Glory of Leiden' × 'King Alfred.')

DAWSON CITY (van Tubergen), **A.M.**—Vigorous; stem 18 inches, stiff; flower well posed; perianth 3½ inches diameter, flat, segments overlap for half of their length, sulphur; trumpet 1½ inch wide, 1$\frac{7}{10}$ inch deep, mouth straight, pale buttercup-yellow. Bulb large, rapid of increase, free flowering. April 7 to May 1.

CONDOR (van Tubergen), **H.C.**—Vigorous; stem 18 inches, stiff; flower well posed; perianth 3½ inches diameter, segments overlap for a half of their length, irregular, pale sulphur; trumpet 1$\frac{7}{10}$ inch wide, 1½ inch deep, mouth expanded and frilled, deep sulphur. Bulb large, rapid of increase, free flowering. April 7 to May 1. Raised by sender.

APOTHEOSIS (van Tubergen).—Vigorous; stem 16 inches; flower well posed; perianth 4½ inches diameter, segments overlap for a third of their length, irregular, sulphur; trumpet 2 inches deep and wide, mouth expanded, margins deeply crenate, lemon-yellow. Bulb large, slow to increase, shy flowerer. April 7 to May 5. Raised by sender.

STANDARD (van Tubergen).—Vigorous; stem 18 inches, stiff; flower well posed; perianth 4½ inches diameter, flat, segments overlap for a third of their length, pale lemon; trumpet 1$\frac{7}{10}$ inch wide, 1½ inch deep, expanded at the mouth, buttercup-yellow. Bulb large, of rapid increase, free flowering. April 2 to May 1. Raised by sender.

PREMIER (Bath).—Vigorous; stem 15 to 18 inches, stiff; flower well posed; perianth 4 inches diameter, flat, segments overlap for half of their length, pale lemon-yellow; trumpet 1½ inch wide and deep, somewhat expanded at the mouth, pale buttercup-yellow. Bulb large, of medium increase, not very free flowering. April 11 to May 5. Raised by sender.

REFINEMENT (van Tubergen).—Vigorous; stem 15 inches; flower drooping; perianth 4 inches diameter, flat, segments overlap for half of their length, pale lemon-yellow; trumpet 2 inches wide, 1½ inch deep, expanded and flat at the mouth, buttercup-yellow. Bulb large, of rapid increase, not very free flowering. April 11 to May 1. Raised by senders.

ADVANCE GUARD (Bath).—Vigorous; stem 18 inches, stiff; flower well posed; perianth 4½ inches diameter, segments overlap at base only, twisted with recurving margins, inflexed, lemon; trumpet 2½ inches wide, 2½ inches deep, mouth expanded, margins reflexed, buttercup-yellow. Free flowering. April 1 to May 5. Raised by Rev. G. H. Engleheart.

EDGAR THURSTON (Secrett), **A.M.**—Vigorous; stems 18 to 20 inches, inclined to droop; flower well posed; perianth 4½ inches, segments overlap at base only, somewhat twisted with recurving margins, inflexed, lemon; trumpet 2 inches wide, 2½ inches deep, mouth expanded and somewhat frilled, buttercup-yellow. Free flowering. April 1 to May 1.

GRENADIER (Cranfield), **A.M.**—Vigorous; stem 15 inches, stiff; flower well posed; perianth 3½ inches, flat, segments overlap for half of their length, lemon-yellow; trumpet 1$\frac{7}{10}$ inch wide, 1½ inch deep, somewhat expanded at the mouth, margins reflexed, deep lemon-yellow. Bulb large, of rapid increase, free flowering. April 10 to May 5.

MOUNTAINEER (Cranfield).—Vigorous; stem 16 inches; flower well posed; perianth 3½ inches diameter, segments overlap for half of their length, somewhat incurving, lemon-yellow; trumpet 1½ inch wide, 1½ inch deep, expanded at the mouth, margins reflexed, deep lemon-yellow. Bulb large, of medium increase, not very free flowering. April 12 to May 3. Raised by Rev. G. H. Engleheart.

PRINCESS JULIANA (Barr).—Stem 15 inches; flower well posed; perianth 4 inches diameter, segments overlap for a third of their length, irregular, lemon-yellow; trumpet 1½ inch wide, 1½ inch deep, mouth expanded, buttercup-yellow. Bulb of medium size, slow of increase, shy flowerer. April 1 to April 28. Raised by Messrs. de Graaff Bros.

VIGOUR (van Tubergen).—Vigorous; stem 16 inches; flower well posed; perianth 4½ inches diameter, segments twisted, overlapping for a third of their length, irregular, lemon-yellow; trumpet 2½ inches wide, 1½ inch deep, mouth somewhat expanded and flat, bright buttercup-yellow. Bulb large, of rapid increase, free flowering. April 1 to May 1. Raised by sender.

FANTIN LATOUR (Barr).—Stem 16 inches; flower well posed; perianth 3½ inches diameter, segments overlap for half of their length, inflexed, irregular, bright lemon-yellow; trumpet 1½ inch wide, 1½ inch deep, mouth expanded,

margins reflexed, buttercup-yellow. Bulb of medium size, slow to increase, not very free flowering. April 11 to May 1. Raised by Messrs. de Graaff Bros.

AGNOSTIC (Cranfield).—Vigorous; stem 16 inches; flower well posed; perianth 3¾ inches diameter, segments overlap for a quarter of their length, incurving, irregular, deep lemon-yellow; trumpet 2 inches wide, 1¾ inches deep, mouth expanded and somewhat frilled, buttercup-yellow. Bulb of medium size and increase, not very free flowering. April 14 to May 5. Raised by Rev. G. H. Engleheart.

CONCORDIA (van Tubergen).—Vigorous, stem 20 inches, stiff; flower well posed; perianth 4¾ inches diameter, segments overlap for a third of their length, irregular, bright rich lemon; trumpet 2 inches wide, 1¾ inch deep, mouth expanded and frilled, buttercup-yellow. Bulb large, of medium increase, not very free flowering. April 1 to May 5. Raised by sender.

THE MARQUIS (Bath).—Vigorous, stem 21 inches; flower well posed; perianth 3¾ inches diameter, flat, segments overlap at base only, irregular, bright lemon-yellow; trumpet 1¾ inch wide, 1¾ inch deep, mouth expanded and frilled, buttercup-yellow. Bulb of medium size, slow to increase, shy flowerer. April 7 to May 1. Raised by sender.

ALFRED HARTLEY (Secrett).—Vigorous; stem 16 inches, stiff; flower well posed; perianth 3¾ inches diameter, segments incurving, overlap for half of their length, irregular, bright deep lemon-chrome; trumpet 1¾ inch wide, 1¾ inch deep, expanded and frilled at the mouth, margins reflexed, a shade darker than perianth. Free flowering. April 7 to May 5. Raised by Rev. G. H. Engleheart.

WINTER GOLD (Barr).—Stem 15 inches; flower inclined to droop; perianth 3¾ inches diameter, segments overlap for a quarter of their length, irregular, deep chrome-yellow; trumpet 1¾ inch deep and wide, somewhat expanded and frilled at the mouth, deep chrome-yellow. Bulb of medium size, slow to increase, shy flowerer. March 28 to April 26. Raised by sender. 'King Alfred' × 'Lady Warren.'

Division 1*b*.

Trumpet varieties with white flowers.

AWARD.

Mrs. Robert Sydenham, A.M. (*g.*) April 10, 1931. Raised by Messrs. de Graaff Bros., and sent by Messrs. Bath of Wisbech. [C. 1930.]

REGULARITY (van Tubergen).—Vigorous; stem 13 inches; flower drooping; perianth 3¾ inches diameter, segments flat, overlap for half of their length, creamy-white; trumpet 1¾ inch wide, 1¾ inch deep, pale cream. Bulb large, of medium increase, free flowering. April 22 to May 7. Raised by sender.

SATISFACTION (van Tubergen).—Very vigorous; stem 14 inches; flower drooping; perianth 3¾ inches diameter, flat, segments overlap for half of their length, creamy white; trumpet 1 7/10 inch wide, 1¾ inch deep, expanded at the mouth, pale dull cream. Bulb large, of medium increase, free flowering. April 11 to May 5. Raised by sender.

ESKIMO (G. L. Wilson).—Vigorous; stem 16 inches; flower drooping; perianth 3¾ inches diameter, segments overlap for half of their length, creamy-white; trumpet 1¾ inch wide and deep, somewhat expanded and frilled at the mouth, creamy white, margins pale cream. Bulb of medium size and increase, not very free flowering. April 15 to May 7. Raised by the Brodie of Brodie.

ST. GERMANS (Barr).—Stem 15 inches; flower well posed; perianth 4 inches diameter, segments overlap for a third of their length, incurving, pale creamy-white; trumpet 1¾ inch wide and deep, somewhat expanded at the mouth, creamy-white. Bulb of medium size, slow to increase, shy flowerer. April 11 to April 28. Raised by sender. 'Madame de Graaff' × 'Duchess of Westminster.'

MRS. D. V. WEST (Barr).—Stem 15 inches; flower inclined to droop; perianth 4 inches diameter, segments overlap for half of their length, irregular, creamy-white; trumpet 1¾ inch wide and deep, expanded at the mouth, sulphur. Bulb of medium size, slow to increase, shy flowerer. April 16 to May 5. Raised by Mr. D. V. West.

IONA (Bliss).—Vigorous; stem 16 inches, stiff; flower drooping; perianth 3¾ inches diameter, segments overlap for a quarter of their length, margins recurving, creamy-white; trumpet 1¾ inch wide, 1¾ inch deep, mouth expanded, sulphur, fading. Bulb of medium size and increase, shy flowerer. April 15 to May 5. Raised by sender. 'Madame de Graaff' × 'Duke of Bedford.'

WHITE EMPEROR (Cranfield).—Vigorous; stem 15 inches; flower well posed;

perianth 3¼ inches diameter, flat, segments overlap for half of their length, regular, creamy-white; trumpet 1¼ inch wide, 1¼ inch deep, mouth very slightly expanded, pale cream fading to creamy-white. Bulb large, of medium increase, free flowering. April 14 to May 5. Raised by Rev. G. H. Engleheart.

TAMORA (Barr).—Vigorous; stem 13 inches; flower inclined to droop; perianth 3¼ inches diameter, flat, segments overlap for a third of their length, irregular, pointed, creamy-white; trumpet 1¼ inch wide, 1¼ inch deep, expanded at the mouth, cream. Bulb of medium size, slow of increase, not very free flowering. April 22 to May 7. Raised by sender.

MRS. G. H. BARR (Barr, Hawker).—Stem 13 inches; flower drooping; perianth 3¼ inches diameter, segments overlap for a third of their length, inflexed, margins recurved, creamy-white; trumpet 1¼ inch wide, 1¼ inch deep, mouth expanded, cream. Bulb of medium size and increase, not very free flowering. April 7 to April 28. Raised by Messrs. de Graaff, Bros. 'Madame de Graaff' seedling.

DRUSILLA (Barr).—Vigorous; stem 15 inches; flower well posed; perianth 3¼ inches diameter, segments overlap at base only, margins recurving, creamy-white; trumpet 1¼ inch wide, 1¼ inch deep, mouth expanded and frilled, margins reflexed, cream. Bulb of medium size, slow to increase, shy flowerer. April 16 to May 7. Raised by sender.

AILSA (Barr).—Vigorous; stem 16 inches; flower well posed; perianth 3¼ inches diameter, segments overlap at base only, inflexed, creamy-white; trumpet 1¼ inch wide and deep, pinched at the middle, mouth expanded and frilled, margins reflexed, cream. Bulb of medium size, slow to increase, not very free flowering. April 22 to May 7. Raised by Mr. E. M. Crosfield.

BEERSHEBA (G. L. Wilson).—Very vigorous; stem 15 inches, stiff; flower drooping; perianth 4¼ inches diameter, flat, segments regular, overlap half of their length, pointed, creamy-white; trumpet 1¼ inch wide, 2 inches deep, somewhat expanded at the mouth, creamy-white. Bulb large, of medium increase, not very free flowering. April 7 to May 1. Raised by Rev. G. H. Engleheart.

ALBA (Watts).—Very vigorous; stem stiff; flower well posed; perianth 4¼ inches diameter, flat, segments overlap for a third of their length, regular, creamy-white; trumpet 1¼ inch wide, 2 inches deep, mouth expanded, deep cream. Bulb large, of medium increase, not very free flowering. April 2 to May 1. Raised by Mrs. R. O. Backhouse.

MRS. ROBERT SYDENHAM (Bath), **A.M.**—Very vigorous; stem 15 inches, stiff; flower drooping; perianth 3¼ inches diameter, flat, segments regular, overlap for a half of their length, somewhat pointed, creamy-white; trumpet 1¼ inch wide, 1¼ inch deep, mouth very slightly expanded, creamy-white. Bulb large, rapid of increase, very free flowering. April 14 to May 5.

HUGH ALDERSEY (H. Aldersey).—Stem 10 inches, stiff; flower drooping; perianth 3¼ inches diameter, flat, segments overlap at base only, regular, creamy-white; trumpet 1 inch wide, 1¼ inch deep, mouth expanded, pale creamy-sulphur, margin creamy-white. Bulb of medium size and increase, shy flowerer. April 14 to May 1. Raised by sender in 1917.

SNOWSCAPE (G. L. Wilson).—Vigorous; stem 12 inches; flower inclined to droop; perianth 3¼ inches diameter, flat; segments incurving, irregular, overlap for a half of their length, creamy-white; trumpet 1¼ inch wide and deep, expanded and frilled at the mouth, pale cream passing to creamy-white. Bulb of medium size and increase, full flowering. April 25 to May 7. Raised by Rev. G. H. Engleheart.

KOTICK (Cranfield).—Vigorous; stem 13 inches; flower drooping; perianth 3¼ inches diameter, flat, segments irregular, overlap for a half of their length, creamy-white; trumpet 1¼ inch wide, 1¼ inch deep, mouth expanded and somewhat frilled, pale cream passing to creamy-white. Bulb of medium size and increase, not very free flowering. April 24 to May 7. Raised by Rev. G. H. Engleheart.

CUMULUS (Cranfield).—Vigorous; stem 15 inches, stiff; flower well posed; perianth 3¼ inches diameter, flat, segments regular, somewhat incurving, overlap for a half of their length, creamy-white; trumpet 1¼ inch wide, 1¼ inch deep, mouth somewhat expanded and frilled, creamy-white. Bulb of medium size and increase, not very full flowering. April 22 to May 7. Raised by Rev. G. H. Engleheart.

PRÉSIDENT FAURE (Barr).—Vigorous; stem 18 inches; flower well posed; perianth 3¼ inches diameter, segments twisted, irregular, overlap at base only, creamy-white; trumpet 2 inches wide, 1¼ inch deep, pale primrose, mouth frilled and somewhat expanded. Bulb of medium size and increase, free flowering. April 1 to April 26. Raised by Messrs. de Graaff Bros.

Division 1*c*.

Trumpet varieties with trumpet deeper in colour than the perianth.

AWARDS.

Purrum, A.M. (*g.*) April 25, 1930. Raised and sent by Mr. Hugh Aldersey.
Centenaire, A.M. (*g.*) April 25, 1930. Sent by Messrs. J. B. van der Schoot, Hillegom, Holland.
Tatcho Pal, A.M. (*g.*) April 10, 1931. Raised and sent by Mr. H. Aldersey.
Nero, C. (*g.*) April 25, 1930. Raised and sent by Messrs. Barr, King St., Covent Garden, W.C.
Lady Mine, C. (*g.*) April 17, 1931. Raised and sent by Messrs. J. R. Pearson, Lowdham, Notts.

PURRUM (Aldersey), **A.M.**—Vigorous; stem 20 inches, stiff; flower well posed; perianth 4½ inches diameter, segments twisted, overlap for third of length, creamy-white; trumpet 1¾ inch wide, 1¾ inch deep, sulphur, mouth slightly expanded. Bulb large, increase rapid, free. April 14 to May 5.

KINGSLEY FAIRBRIDGE (Secrett).—Very vigorous; stem 18 inches; flower well posed; perianth 4½ inches diameter, flat, segments overlap for half of their length, pointed, creamy-white; trumpet 1½ inch wide, 2 inches deep, sulphur-yellow, mouth somewhat expanded. Bulb large, of medium increase, free flowering. April 15 to May 5. Raised by Rev. G. H. Engleheart.

ELDRED (Barr).—Vigorous; stems 19 inches, weak; flowers well posed; perianth 3¾ inches diameter, flat, segments overlap for half of their length, somewhat pointed, creamy-white; trumpet 1 1/10 inch wide, 1½ inch deep, bright sulphur, mouth expanded and frilled. Bulb of medium size and increase, free flowering. April 15 to May 1. Raised by sender.

LADY MINE (Pearson), **C.**—Described R.H.S. JOURNAL, vol. **53**, p. 381.

ST. WENDRONA (Barr).—Vigorous; stems 10 inches; flower drooping; perianth 3¾ inches, flat, segments overlap for a third of their length, inflexed, irregular, creamy-white; trumpet 1½ inch wide, 1¾ inch deep, sulphur, fading, mouth expanded and somewhat frilled. Bulb of medium size, slow of increase, shy flowerer. April 12 to May 1. Raised by sender.

CENTENAIRE (J. B. van der Schoot), **A.M.**—Described R.H.S. JOURNAL, vol. **53**, p. 382, under name 'Purity.'

FROSTBOUND (Hawker).—Vigorous; stem 12 inches; flower drooping; perianth 3¾ inches, segments inflexed, irregular, pointed, overlap at the base only, creamy-white; trumpet 1½ inch wide, 1½ inch deep, sulphur, mouth expanded. Bulb of medium size and increase, not very free flowering. April 15 to May 5. Raised by Mr. E. M. Crosfield.

ALEXIS (Barr).—Vigorous; stem 15 inches; flower well posed; perianth 3½ inches diameter, flat, segments regular, pointed, overlap for half of their length, creamy-white; trumpet 1½ inch wide, 1½ inch deep, sulphur. Bulb of medium size and increase, free flowering. April 16 to May 7. Raised by sender.

CARMENTA (Barr).—Stem 13 inches; flower inclined to droop; perianth 3¾ inches diameter, flat, segments regular, overlap for half of their length, creamy-white; trumpet 2 inches wide, 1½ inches deep, deep sulphur, mouth much expanded. Bulb of medium size and increase, not very free flowering. April 16 to May 7. Raised by sender.

ROSEMARY (Aldersey).—Vigorous; stem 17 inches; flower inclined to droop; perianth 3¾ inches diameter, segments regular, overlap at base only, inflexed, creamy-white; trumpet 1½ inch wide, 1¾ inch deep, deep sulphur, mouth expanded and frilled. Bulb large, of medium increase, not very free flowering. April 14 to May 5. Raised by sender in 1920.

DUKE OF ANJOU (Barr).—Vigorous; stem 16 inches; flower well posed; perianth 3¾ inches diameter, flat, segments regular, overlap for half of their length, creamy-white; trumpet 1½ inch wide, 1¾ inch deep, lemon-yellow, mouth somewhat expanded and frilled. Bulb of medium size and increase, not very free flowering. April 16 to May 7. Raised by sender. 'Peter Barr' seedling.

MRS. JOHN HOOG (van Tubergen).—Vigorous; stem 16 inches, stiff; flower well posed; perianth 3¾ inches diameter, segments irregular, inflexed, overlap for half of their length, margins incurving, creamy-white, base cream; trumpet 1½ inch wide, 1 7/8 inch deep, lemon-yellow, mouth expanded, frilled. Bulb large, increase medium, not free flowering. April 7 to May 1. Raised by sender.

HEROD (Barr).—Vigorous; stem 13 inches; flower drooping; perianth 4 inches diameter, flat, segments irregular, somewhat pointed, overlap for a

third of their length, creamy-white, base lemon; trumpet 1¼ inch wide, 1 1/10 inch deep, rich lemon-yellow, mouth expanded. Bulb of medium size and increase, not very free flowering. April 6 to April 28. Raised by Mr. E. M. Crosfield.

NERO (Barr), C.—Vigorous; stem 18 inches, stiff; flower well posed; perianth 3½ inches diameter, segments twisted, regular, overlap at base, creamy-white; trumpet 2 inches wide, 1½ inch deep, pale buttercup-yellow, mouth expanded. Bulb large, of rapid increase, free flowering. April 15 to May 7.

TATCHO PAL (H. Aldersey), A.M.—Vigorous; stem 18 inches; flower well posed; perianth 4 inches diameter, flat, segments regular, overlap for a half of their length, creamy-white, base sulphur; trumpet 1¼ inch wide and deep, buttercup-yellow, mouth almost straight and frilled. Bulb large, of medium increase, not very free flowering. April 1 to May 1. Raised by sender in 1918.

Division 2a.

Yellow varieties with corona shorter than perianth.

AWARDS.

Strigil, A.M. (*g.*) April 25, 1930. Raised by the Rev. G. H. Engleheart and sent by Mr. W. B. Cranfield, East Lodge, Enfield Chase.

Tuscan, C. (*g.*) April 10, 1931. Raised and sent by Mr. A. M. Wilson.

ROWNER (Churcher).—Vigorous; stem 19 inches, stiff; flower well posed; perianth 3½ inches diameter, flat, regular, segments overlap for two-thirds of their length, creamy-white, base lemon; corona broadly funnel shaped, 1 inch deep, bright lemon. Bulb of medium size and increase, full flowering. April 14 to May 1. Raised by sender.

PRIDE OF THE MARKET (Bath).—Vigorous, with very grey foliage; stem 20 inches; flower well posed; perianth 3½ inches diameter, flat, segments overlap for a half of their length, pale cream; corona 1 inch deep, funnel shaped, bright orange-yellow. Bulb large, of medium increase, free flowering. April 19 to May 7. Raised by sender.

BLACKWELL (Barr).—Foliage drooping; stem 16 inches; flower well posed; perianth 3½ inches diameter, flat, segments separated, irregular, creamy-sulphur; corona 1/10 inch deep, funnel shaped, lemon tinged with orange. Bulb of medium size and increase, free flowering. April 12 to May 2. Raised by Mr. W. Backhouse.

NANCY ELIOTT (Churcher).—Stem 15 inches; flower well posed; perianth 3½ inches diameter, flat, segments regular, overlap half their length, pale sulphur; corona broadly funnel shaped, 1 inch deep, lemon-yellow. Bulb of medium size and increase, free flowering. April 16 to May 5. Raised by sender.

FIREGLOW (Barr).—Foliage drooping; stem 16 inches; flower drooping; perianth 3½ inches diameter, segments irregular, separated, pale sulphur; corona ½ inch deep, funnel shaped, lemon passing to bright orange at margins. Bulb of medium size, slow to increase, shy. April 12 to May 5. Raised by sender.

SINTRAM (Bliss).—Stem 17 inches; flower drooping; perianth 3 inches diameter, flat, segments irregular, overlap for half of their length, pale sulphur; corona ½ inch deep, tubular, bright lemon suffused with orange. Bulb large, slow to increase, shy flowerer. April 16 to May 7. Raised by sender. 'Mrs. C. Bowley' × *N. abscissus*.

LUCILLE (Barr).—Stem 12 inches; flower well posed; perianth 3½ inches diameter, flat, segments irregular, overlap half length, sulphur with faint white streaks; corona ½ inch deep, broadly funnel shaped, lemon. Bulb of medium size and increase, shy. April 14 to May 5. Raised by Mr. C. Dawson.

CITRIONA (Barr).—Stem 16 inches; flower well posed; perianth 3½ inches diameter, flat, segments irregular, overlap at base, sulphur; corona ½ inch deep, deep sulphur, funnel shaped. Bulb of medium size, slow to increase, not very free flowering. April 14 to May 5. Raised by sender.

GAJO (H. Aldersey).—Vigorous; stem 16 inches; flower drooping; perianth 3½ inches diameter, flat, segments overlap for a third of their length, regular, sulphur; corona 1 1/10 inch deep, funnel shaped, pale buttercup-yellow. Bulb large, slow to increase, not very free flowering. April 2 to May 1. Raised by sender in 1917.

TUSCAN (A. M. Wilson), C.—Vigorous; stem 17 inches; flower inclined to droop; perianth 4½ inches diameter, flat, segments overlap at base, irregular, bright sulphur; corona ½ inch deep, funnel shaped, lemon-yellow, margins

tinged with orange. Bulb large, of rapid increase, free flowering. April 1 to April 28. Raised by sender.

MITHRAS (van Tubergen).—Very vigorous; stem 17 inches; flower well posed; perianth 4½ inches diameter, flat, segments overlap for half of their length, somewhat pointed, sulphur; corona 1½ inch deep, mouth expanded and frilled, buttercup-yellow. Bulb large, of medium increase, not very free flowering. April 1 to April 26. Raised by sender.

STRIGIL (Cranfield), **A.M.**—Vigorous; stem 18 inches, stiff; flower well posed; perianth 3½ inches diameter, segments overlap for a half of their length, sulphur suffused with lemon-yellow; trumpet 1½ inch wide and deep, expanded at the mouth, pale buttercup-yellow. Bulb large, of rapid increase, free flowering. April 10 to May 7. Raised by Rev. G. H. Englebert, 1916.

GAIETY (Bath).—Vigorous; stem 19 inches; flower well posed; perianth 4½ inches diameter, flat, segments irregular, separated, sulphur; corona 1 inch deep, funnel shaped, mouth much frilled, bright orange. Bulb of medium size, slow to increase, not very free flowering. April 7 to May 1. Raised by sender.

ST. IVES (P. D. Williams).—Stem 16 inches; flower inclined to droop; perianth 3½ inches diameter, flat, segments regular, overlap for half of their length, deep sulphur; corona 1½ inch deep, straight, deep sulphur-yellow, mouth frilled. Bulb of medium size, slow to increase, shy flowerer. April 7 to April 28. 'King Alfred' × *Leedsii*. Raised by sender.

HAVELOCK (P. D. Williams).—Stem 16 inches; flower well posed; perianth 3½ inches diameter, flat, segments overlap for half of their length, primrose with white tips; corona 1 inch deep, funnel shaped, pale buttercup-yellow, mouth frilled. Bulb of medium size, slow to increase, shy flowerer. April 11 to May 1. Raised by sender.

LADYBIRD (Barr).—Stem 14 inches; flower inclined to droop; perianth 2½ inches diameter, segments twisted, separated, irregular, pointed, primrose with white tips; corona ½ inch deep, straight, orange-yellow, base primrose, mouth somewhat frilled. Bulb of medium size and increase, free flowering. April 2 to April 28. Raised by Mrs. R. O. Backhouse.

TREWINCE (P. D. Williams).—Vigorous; stem 17 inches, rather weak; flower drooping; perianth 4 inches diameter, segments overlap for a third of their length, irregular, clear primrose; corona 1½ inch deep, pale buttercup-yellow, mouth expanded and somewhat frilled. Bulb of medium size and increase, not free flowering. April 2 to May 1. Raised by sender.

REDFAST (Bliss).—Stem 14 inches; flower well posed; perianth 2½ inches diameter, flat, segments overlap at base with reflexed tips, deep primrose; corona ½ inch deep, straight, bright orange. Bulb of medium size, slow to increase, shy flowerer. April 24 to May 7.

FIRELIGHT (Barr).—Stem 9 inches; flower drooping; perianth 2½ inches diameter, segments separated, irregular, with incurving margins, pale bright lemon; corona $\frac{1}{10}$ inch deep, funnel shaped, lemon broadly edged orange-red. Bulb of medium size, slow to increase, shy flowerer. April 8 to April 28. Raised by Mrs. R. O. Backhouse.

MORNING GLORY (Barr).—Stem 12 inches; flower well posed; perianth 2½ inches diameter, flat, segments regular, overlap for a third of their length, rich clear lemon-yellow; corona $1\frac{1}{10}$ inch deep, tubular, pale buttercup-yellow, mouth frilled. Bulb of medium size, slow to increase, not very free flowering. April 16 to April 28. Raised by the Brodie of Brodie.

ROUNDLE (Cranfield).—Vigorous; stem 14 inches, stiff; flower well posed; perianth 3½ inches diameter, segments irregular, overlap for a third of their length, clear lemon; corona 1½ inch deep, straight, clear pale buttercup-yellow. Bulb of medium size and increase, free flowering. Raised by Rev. G. H. Engleheart.

FARTHINGALE (Cranfield).—Vigorous; stem 15 inches, stiff; flower well posed; perianth 4 inches diameter, flat, segments regular, overlap for half of their length, clear lemon; corona ½ inch deep, tubular, buttercup-yellow. Bulb large, of medium increase, free flowering. April 16 to May 16. Raised by Rev. G. H. Engleheart.

LEONTES (Cranfield).—Vigorous; stem 12 inches; flower well posed; perianth 3½ inches diameter, flat, segments irregular, overlap for half of their length, lemon; corona ½ inch deep, funnel shaped, buttercup-yellow. Bulb large of medium increase, not very free flowering. Raised by Mr. A. M. Wilson.

Division 2b.

Bicolor varieties with corona shorter than perianth.

AWARDS.

Warlock, A.M. (*g.*) April 25, 1930. Raised and sent by Mr. P. D. Williams, Lanarth, St. Keverne.

Lady Margaret Boscawen, C. (*g.*) Raised by Rev. G. H. Engleheart and sent by Messrs. Bath, Wisbech.

WHITE COLOSSUS (Barr).—Foliage drooping; stem 15 inches, stiff; perianth 3½ inches diameter, flat, segments overlap for half of their length, regular, white; corona 1½ inch deep, creamy-yellow flushed orange, mouth expanded. Bulb large, rapid of increase, very free flowering. April 14 to May 1. Raised by Messrs. C. G. van Tubergen.

PEDESTAL (Barr).—Stem 12 inches; flower inclined to droop; perianth 3½ inches diameter, flat, segments regular, overlap for half of their length, opening primrose fading quickly to creamy-white; corona 1½ inch deep, funnel shaped, lemon-yellow. Bulb of medium size, slow to increase, not very free flowering. April 16 to May 5. Raised by Mr. E. M. Crosfield.

CURLEW (Watts).—Stem 17 inches, stiff; flower well posed; perianth 3½ inches diameter, flat, segments overlap for half of their length, irregular, creamy-white; corona 1 inch deep, funnel shaped, bright lemon. Bulb of medium size and increase, not very free flowering. Raised by Mrs. R. O. Backhouse.

ALCESTE (van Tubergen).—Stem 18 inches, stiff; flower well posed; perianth 4 inches diameter, segments regular, inflexed, overlap for a third of their length with incurving margins, white with a cream base; corona 1 inch deep, broadly funnel shaped, rich lemon-yellow. Bulb large, of rapid increase, very free flowering. Raised by sender.

VALET (Bath).—Foliage drooping; stem 20 inches; flower well posed; perianth 4 inches diameter, segments irregular, overlap for a third of their length with incurving margins, opening very pale sulphur quickly passing to creamy-white with a lemon base; corona 1½ inch deep, deep lemon-yellow, mouth much expanded. Bulb of medium size and increase, free flowering. April 12 to May 5. Raised by sender.

CARADON (Bliss).—Foliage drooping; stem 18 inches, stiff; flower inclined to droop; perianth 4 inches diameter, segments separated, irregular, creamy-white with a lemon-base; corona 1 inch deep, funnel shaped, rich lemon-yellow. Bulb of medium size, slow of increase, not very free flowering. April 10 to May 7. Raised by sender. 'Virgil' × 'Monarch,' 1914.

MICHAEL ANGELO (Barr).—Not vigorous; stem 17 inches, stiff; flower drooping; perianth 3½ inches diameter, flat, segments regular, overlap for half of their length, white; corona ½ inch deep, very broadly funnel shaped, pale lemon edged orange-red, mouth frilled. Bulb small, of medium increase, not very free flowering. April 12 to May 1. Raised by Mr. P. D. Williams.

LAUGHTER (Watts).—Foliage drooping; stem 17 inches; flower drooping; perianth 3 inches diameter, flat, segments irregular, reflexed, overlap for half of their length, creamy-white; corona ½ inch deep, broadly funnel shaped, sulphur broadly edged bright orange-red, mouth frilled. Bulb of medium size and increase, not very free flowering. April 28 to May 16. Raised by Mrs. R. O. Backhouse.

ELSPETH (P. D. Williams).—Stem 16 inches; flower well posed; perianth 3 inches diameter, flat, segments irregular, reflexed, overlap for two-thirds of their length, creamy-white; corona ½ inch deep, basin shaped, sulphur narrowly edged with orange. Bulb of medium size, rapid of increase, free flowering. April 12 to May 1. Raised by sender.

WARLOCK (P. D. Williams), **A.M.**—Vigorous; stem 20 inches, stiff; flower well posed; perianth 3½ inches diameter, flat, regular, segments overlap for two-thirds of their length, creamy-white with a yellow base; corona $\frac{1}{10}$ inch deep, funnel shaped, yellow shading to orange at the mouth which is frilled. Bulb large, rapid of increase, free flowering. April 15 to May 5.

KENNACH (P. D. Williams).—Foliage droops at the tips; stem 22 inches, stiff; flower well posed; perianth 3½ inches diameter, flat, segments regular, overlap for half of their length, creamy-white; corona $\frac{1}{10}$ inch deep, funnel shaped, orange-yellow, mouth frilled. Bulb of medium size and increase, not very free flowering. April 22 to May 7. Raised by sender. Seedling from 'Oriflamme' × *Leedsii*.

WILL SCARLETT (Hawker).—Foliage drooping; stem 16 inches, drooping; flower drooping; perianth 3½ inches diameter, segments twisted, reflexed, separated, creamy white; corona ½ inch deep, cup-shaped, bright rich orange, fading. Bulb of medium size and increase, not very free flowering. April 22 to May 7. Raised by Rev. G. H. Engleheart.

Division 3*b*.

Bicolor varieties with short corona.

AWARDS.

Penny-come-quick, A.M. (*m.*) May 5, 1930. Raised and sent by Mr. P. D. Williams.

Melanite, A.M. (*m.*) May 5, 1930. Raised and sent by Mr. P. D. Williams.

MAUREEN (Cranfield).—Stem 16 inches; flower drooping; perianth 3 inches diameter, flat, segments overlap with recurving margins, creamy-white with cream base; corona ¼ inch deep, tubular, sulphur, mouth frilled. Bulb of medium size and increase, free flowering. May 5 to May 22. Raised by Rev. G. H. Engleheart.

WHITE STAR (Barr).—Not vigorous; stem 16 inches; flower drooping; perianth 3½ inches diameter, flat, segments regular, separated, white with sulphur base; corona $\frac{1}{10}$ inch deep, saucer shaped, clear sulphur. Bulb small, of medium increase, not very free flowering. April 16 to May 7. Raised by Mr. J. C. Williams.

ST. ANTHONY (A. M. Wilson).—Foliage drooping at tips; stem 18 inches; flower inclined to droop; perianth 3$\frac{1}{10}$ inches diameter, flat, segments irregular, overlap at base only, white; corona ¾ inch deep, cup shaped, pale cream, margins bright pale orange and frilled. Bulb small, of medium increase, free flowering. April 28 to May 16. Raised by Mrs. R. O. Backhouse.

FLORIZEL (Barr).—Stem 16 inches; flower inclined to droop; perianth 2½ inches diameter, flat, segments irregular, overlap for half of their length, creamy-white, base cream; corona ¼ inch deep, basin shaped, pale sulphur, margins frilled, pale orange. Bulb small, of medium increase, free flowering. April 24 to May 16. Raised by Mr. C. Dawson. 'Lulworth' × 'Horace.'

RED BEACON (Barr).—Stem 17 inches; flower drooping; perianth 3 inches diameter, flat, segments irregular, reflexed, overlap for a third of their length, creamy-white; corona ¼ inch deep, saucer-shaped, sulphur, margins frilled, orange. Bulb small, of medium increase, free flowering. April 24 to May 16. Raised by Mr. J. C. Williams.

JAMES DOUGLAS (Churcher).—Foliage with drooping tips; stem 16 inches; flower drooping; perianth 3 inches diameter, flat, segments irregular, overlap for half of their length, creamy-white; corona $\frac{1}{10}$ inch deep, saucer shaped, greenish-lemon with orange frilled margins. Bulb large, of medium increase, free flowering. May 5 to May 19. Raised by Mr. F. H. Chapman.

BIRD OF PARADISE (van Tubergen).—Stem 19 inches; flower well posed; perianth 3½ inches diameter, flat, segments irregular, separated, white, base sulphur; corona ¼ inch deep, saucer shaped, deep sulphur narrowly edged with orange. Bulb large, of medium increase, free flowering. April 12 to May 1. Raised by sender.

ST. JUST (P. D. Williams).—Foliage drooping; stem 20 inches, brittle; flower well posed; perianth 3½ inches diameter, flat, segments irregular, overlap for half of their length, pale cream, base sulphur; corona ½ inch deep, basin shaped, deep sulphur, broadly edged with orange. Bulb of medium size, rapid of increase, free flowering. April 14 to May 5. Raised by sender.

EVELYN ALDERSEY (H. Aldersey).—Foliage drooping at the tips; stem 16 inches; flower well posed; perianth 3½ inches diameter, flat, segments irregular, separated, white; corona ¼ inch deep, saucer shaped, sulphur with frilled orange margin. Bulb of medium size and increase, free flowering. April 26 to May 16. Raised by sender in 1915.

PANDORA (Barr).—Not very vigorous; stem 14 inches; flower well posed; perianth 2½ inches diameter, flat, segments irregular, overlap for a quarter of their length, creamy-white; corona $\frac{1}{10}$ inch deep, basin shaped, pale orange-yellow. Bulb small, slow to increase, not very free flowering. April 25 to May 7. Raised by Mr. C. Dawson. 'Lulworth' × 'Horace.'

RUBY (Barr).—Not vigorous; stem 13 inches; flower well posed; perianth 2½ inches diameter, flat, segments irregular, reflexed, overlap for half of their length, creamy-white; corona $\frac{1}{10}$ inch deep, basin shaped, reddish-orange.

Bulb small, slow to increase, shy flowerer. Raised by Mr. C. H. Cave. 'Lulworth' × 'Horace.'

MURIEL BIBBY (Watts).—Foliage inclined to droop; stem 20 inches; flower inclined to droop; perianth 3½ inches diameter, segments irregular, reflexed, overlap for half of their length, creamy-white, base lemon; corona ½ inch deep basin shaped, sulphur, margins frilled, bright orange. Bulb small, of medium increase, free flowering. April 22 to May 7. Raised by Mrs. R. O. Backhouse.

MASTERPIECE (Barr).—Not vigorous; stem 13 inches; flower well posed; perianth 2½ inches diameter, flat, segments reflexed, separated, creamy-white; corona ¼ inch deep, saucer shaped, bright orange, margins frilled. Bulb small, slow to increase, shy flowerer. April 22 to May 7. Raised by Rev. G. H. Engleheart.

VILLAGE BEAUTY (Barr).—Not vigorous; stem 14 inches; flower well posed; perianth 3½ inches diameter, flat, segments overlap for half of their length, creamy-white, base cream; corona $\frac{3}{10}$ inch deep, funnel shaped, lemon edged orange-red. Bulb small, slow to increase, shy flowerer. April 16 to April 28. Raised by Mr. W. Polman-Mooy.

KING GEORGE V. (van Tubergen).—Stem 18 inches; flower well posed; perianth 3 inches diameter, flat, segments regular, overlap for two-thirds of their length, white; corona ¼ inch deep, saucer shaped, sulphur very narrowly edged with red. Bulb small, of medium increase, not very free flowering. April 24 to May 7. Raised by sender.

MELANITE (P. D. Williams), **A.M.**—Vigorous; stem 18 inches, stiff; flower well posed; perianth 3 inches diameter, flat, segments overlap for half of their length, white, base sulphur; corona $\frac{1}{5}$ inch deep, saucer-shaped, sulphur broadly edged orange-red. Bulb of medium size, rapid of increase, free flowering. April 22 to May 5.

PENNY-COME-QUICK (P. D. Williams), **A.M.**—Vigorous; foliage drooping; stem 17 inches, stiff; flower well posed; perianth 3 inches diameter, flat, segments overlap for half of their length, white; corona ¼ inch deep, saucer shaped, pale sulphur narrowly edged with red. Bulb of medium size, very rapid of increase, very free flowering. April 24 to May 16.

TURTLE (Watts).—Stem 14 inches, stiff; flower well posed; perianth $2\frac{3}{10}$ inch diameter, flat, segments reflexed, regular, overlap for two-thirds of their length, white with lemon base; corona ¼ inch deep, saucer shaped, orange with frilled orange-red margins. Bulb of medium size and increase, not very free flowering. Raised by Mrs. R. O. Backhouse.

J. K. RAMSBOTTOM (Secrett).—Vigorous; stem 20 inches, stiff; flower well posed; perianth 3½ inches diameter, flat, segments somewhat reflexed, overlap for half of their length, white with lemon base; corona ¼ inch deep, saucer shaped, orange-yellow broadly margined bright orange-red. Bulb of medium size and increase, free flowering. April 24 to May 7. Raised by Mr. P. D. Williams.

DOROTHY (Hawker).—Stem 16 inches, drooping; flower drooping; perianth 2½ inches diameter, flat, segments separated, creamy-white; corona ½ inch deep, cup shaped, bright rich orange. Bulb of medium size and increase, not very free flowering. April 16 to May 5. Raised by Mr. A. R. Goodwin.

TRIBUNE (Watts).—Stem 16 inches; flower drooping; perianth 3 inches diameter, flat, segments reflexed, overlap for half of their length, creamy-white; corona ½ inch deep, basin shaped, rich bright orange-red. Bulb small, of rapid increase. May 1 to May 16. Raised by Mrs. R. O. Backhouse.

MAYFLOWER (Secrett).—Vigorous; foliage drooping at the tips; stem 17 inches; flower well posed; perianth 2½ inches diameter, flat, segments overlap for half of their length, creamy-white; corona ¼ inch deep, broadly funnel shaped, bright rich fiery-red. Bulb of medium size and increase, free flowering. April 18 to May 10. Raised by Mrs. R. O. Backhouse.

Division 4a.

Pale or white varieties with corona shorter than perianth but over one-third its length.

AWARDS.

Sylvia, A.M. (*g.*) April 11, 1930. Raised and sent by Mr. A. M. Wilson, Presteigh.

Mount Erebus, A.M. (*g.*) April 27, 1931. Raised and sent by Messrs. C. G. van Tubergen.

Cicely, A.M. (*g.*) April 11, 1930. Raised and sent by Mr. A. M. Wilson.
Everlasting, A.M. (*m.*) April 25, 1930. Raised by Rev. G. H. Engleheart and sent by Mr. F. A. Secrett.
Sybil, A.M. (*g.*) April 27, 1931. Raised and sent by Messrs. Bath, Wisbech.
Mitylene, A.M. (*g.*) April 10, 1931. Raised by Rev. G. H. Engleheart and sent by Mr. G. L. Wilson, Broughshane, co. Antrim. [**H.C.** 1930.]
Grayling, A.M. (*g.*) April 10, 1931. Raised and sent by Mr. P. D. Williams.
Stolberg, H.C. (*g.*) April 25, 1930. Raised by Messrs. C. G. van Tubergen and sent by Messrs. Barr, King St., Covent Garden, W.C.
Milkmaid, H.C. (*g.*) April 25, 1930. Raised and sent by Mr. P. D. Williams.
Gyrfalcon, C. (*g.*) April 25, 1930. Raised by Mr. E. M. Crosfield and sent by Mr. P. D. Williams.

SYLVIA (A. M. Wilson), **A.M.**—Vigorous; stem 20 inches; flower drooping; perianth 4½ inches diameter, flat, segments inflexed, overlap for half of their length, white; corona 1½ inch deep, funnel shaped, white, base creamy-white. Bulb of medium size, rapid of increase, free flowering. April 1 to May 5.

HELMET (Cranfield).—Stem 16 inches; flower well posed; perianth 4½ inches diameter, flat, segments irregular, overlap for two-thirds of their length, creamy-white; corona 1½ inch deep, funnel shaped, opening pale cream passing to creamy-white. Bulb of medium size and increase, not very free flowering. April 16 to May 7. Raised by Rev. G. H. Engleheart.

MOUNT EREBUS (van Tubergen), **A.M.**—Stem 17 inches; flower inclined to droop; perianth 4 inches diameter, flat, segments separated, irregular, white; corona 1½ inch deep, funnel shaped, creamy-white. Bulb large, of medium increase, free flowering. April 16 to May 7. Raised by sender.

CICELY (A. M. Wilson), **A.M.**—Very vigorous; stem 19 inches; flower drooping; perianth 3½ inches diameter, flat, segment overlap for half of their length, white; corona 1½ inch deep, funnel shaped, pale cream. Bulb of medium size, rapid of increase, very free flowering. April 1 to May 1.

WINSOME (G. L. Wilson).—Stem 15 inches; flower drooping; perianth 3½ inches diameter, flat, segments irregular, overlap for half of their length, creamy-white; corona 1½ inch deep, tubular, very pale cream. Bulb small, of medium size, free flowering. April 16 to May 5. Raised by sender.

STOLBERG (Barr), **H.C.**—Vigorous; stem 15 inches; flower drooping; perianth 3½ inches diameter, flat, segments irregular, overlap for half of their length, white; corona 1$\frac{1}{10}$ inch deep, tubular, pale cream. Bulb small, rapid of increase, free flowering. April 14 to May 1.

BASILIA (Barr).—Stem 16 inches; flower drooping; perianth 3½ inches deep, flat, segments irregular, overlap for half of their length, creamy-white; corona 1$\frac{1}{10}$ inch deep, funnel shaped, pale cream. Bulb small, slow to increase, shy flowerer. April 12 to May 5. Raised by sender. 'Maggie May' × 'King Alfred.'

ST. GERMANS (Barr).—Stem 17 inches; flower drooping; perianth 3½ inches diameter, flat, segments inflexed, somewhat pointed, overlap for half of their length, creamy-white; corona ½ inch deep, funnel shaped, very pale cream. Bulb small, slow to increase, shy flowerer. April 22 to May 7. Raised by sender.

MILKMAID (P. D. Williams), **H.C.**—Vigorous; stem 20 inches; flower well posed; perianth 4½ inches diameter, flat, segments regular, overlapping, white with a cream tinge; corona 1½ inch deep, funnel shaped, cream passing to waxy-white. Bulb small, rapid of increase, free flowering. April 14 to May 1.

CLARICE (Bath).—Stem 18 inches; flower well posed; perianth 4½ inches diameter, flat, segments inflexed, irregular, pointed, white; corona 1$\frac{1}{10}$ inch deep, broadly funnel shaped, cream. Bulb small, of medium increase, free flowering. April 2 to May 1. Raised by sender.

SEA-SHELL (Cranfield).—Vigorous; stem 20 inches; flower inclined to droop; perianth 4 inches diameter, flat, segments irregular, overlap for half of their length, white; corona ½ inch deep, basin shaped, pale citron, margins faintly shaded with orange. Bulb of medium size and increase, free flowering. April 24 to May 16. Raised by Rev. G. H. Engleheart.

SYBIL (Bath), **A.M.**—Stem 17 inches; flower well posed, neck weak; perianth 3½ inches diameter, segments somewhat inflexed, irregular, overlap for a third of their length, pointed, white; corona 1 inch deep, broadly funnel shaped, pale lemon with darker frilled margins. Bulb small, of medium increase, not very free flowering. Raised by sender.

CZARINA (Barr).—Stem 15 inches; flower inclined to droop with a weak neck; perianth 3½ inches diameter, segments somewhat pointed, overlap for a third of their length, creamy-white; corona 1½ inch deep, funnel shaped, lemon. Bulb

small, slow to increase, shy flowerer. April 12 to April 28. Raised by Mrs. R. O. Backhouse. 'Sir Watkin' × 'Weardale Perfection.'

JACQUELINE (Kitchin).—Very vigorous; foliage drooping; stem 20 inches, weak; flower drooping; perianth 3¼ inches diameter, segments separated, creamy-white; corona 1$\frac{3}{10}$ inch deep, funnel shaped, primrose. Bulb small, of medium increase, free flowering. April 2 to April 24. Raised by sender.

EMPIRE (Barr).—Stem 15 inches; flower well posed; perianth 3½ inches diameter, flat, segments overlap for a quarter of their length, creamy-white; corona 1 inch deep, pale sulphur. Bulb small, slow to increase, shy flowerer. April 8 to April 28. Raised by Mr. E. M. Crosfield.

GRAYLING (P. D. Williams), **A.M.**—Stem 20 inches; flower well posed; perianth 4½ inches diameter, flat, segments overlap for a half of their length, creamy-white; corona 1½ inch deep, funnel shaped, clear sulphur with whitish margins. Bulb of medium size and increase, free flowering. April 14 to May 7. Raised by sender.

CORINNA (van Tubergen).—Very vigorous; stem 20 inches; flower well posed; perianth 3¼ inches diameter, segments channelled, overlap for a third of their length, creamy-white; corona $\frac{9}{10}$ inch deep, funnel shaped, sulphur. Bulb large, rapid of increase, very free flowering. April 2 to May 1. Raised by sender.

GYRFALCON (P. D. Williams), **C.**—For description see R.H.S. JOURNAL, vol. **53**, p. 387.

MITYLENE (G. L. Wilson), **A.M.**—Vigorous; foliage drooping and spreading; stem 18 inches; flowers well posed; perianth 4 inches diameter, flat, segments overlap for half of their length, white; corona ½ inch deep, broadly funnel shaped, sulphur. Bulb small, rapid of increase, free flowering. April 12 to May 5.

SIR GALAHAD (Barr).—Foliage spreading; stem 13 inches; flower well posed; perianth 3¼ inches diameter, flat, segments overlap for half of their length, white; corona $\frac{7}{10}$ inch deep, funnel shaped, sulphur. April 2 to April 24. Raised by Mr. P. D. Williams.

EVERLASTING (Secrett), **A.M.**—Vigorous; stem 13 inches; flower inclined to droop; perianth flat, segments overlap for half of their length, creamy-white, base sulphur; corona 1 inch deep, funnel shaped, very bright deep buttercup-yellow. Bulb of medium size, rapid of increase, very free flowering. April 16 to May 7.

Division 4*b*.

Like 4a but corona less than one-third of perianth.

AWARDS.

Alberni Beauty, A.M. (*g.m.*) May 11, 1931. Raised and sent by Dr. C. T. Hilton, Port Alberni, B.C. [**H.C.** 1930.]

Nelly, H.C. (*g.*) April 27, 1931. Raised and sent by Mr. P. D. Williams.

ALBERNI BEAUTY (Hilton), **A.M.**—Very vigorous; foliage drooping at the tips; stem 22 inches; flower semi-drooping; perianth 3¼ inches diameter, segments overlap for half of their length, white; corona ¼ inch deep, almost flat, sulphur, base green. Bulb large, rapid of increase, free flowering. April 28 to May 19. Raised by sender.

ALBERNI STAR (Hilton).—Habit of 'Alberni Beauty' but perianth segments separated, white with lemon base; corona ¼ inch deep, funnel shaped, sulphur, base green, margins orange. Bulb large, rapid of increase, free flowering.

ST. OLAF (Barr).—Vigorous; stem 20 inches; flower well posed; perianth 3 inches diameter, flat, segments overlap at base only, creamy-white; corona $\frac{3}{10}$ inch deep, funnel shaped, creamy-white. Bulb small, rapid of increase, free flowering. April 22 to May 16. Raised by Rev. G. H. Engleheart.

ROYAL LADY (Barr).—Stem 16 inches; flower inclined to droop; perianth 2¾ inches diameter, segments overlap at base only, creamy-white; corona $\frac{3}{10}$ inch deep, funnel shaped, pale cream. Bulb small, of medium increase, free flowering. April 28 to May 16. Raised by Rev. G. H. Engleheart.

PUCK (Cranfield).—Stem 18 inches; flower well posed; perianth 3½ inches diameter, segments overlap for half of their length, irregular, creamy-white; corona ½ inch deep, basin shaped, pale cream faintly tinged apricot. Bulb small, of medium increase, not very free flowering. April 24 to May 16. Raised by Rev. G. H. Engleheart.

MYSTIC (G. L. Wilson).—Stem 16 inches; flower semi-drooping; perianth 3 inches diameter, flat, segments overlap for half of their length, creamy-white; corona ½ inch deep, saucer shaped, creamy-white narrowly edged with buff.

Bulb small, of medium increase, shy flowerer. April 26 to May 16. Raised by sender.

MIFANWY (Cranfield).—Stem 15 inches; flower inclined to droop; perianth 3½ inches diameter, segments regular, overlap for a quarter of their length, creamy-white; corona ½ inch deep, saucer shaped, pale cream edged with apricot. Bulb small, rapid of increase, free flowering. April 26 to May 16. Raised by Rev. G. H. Engleheart.

SIMPLE (Watts).—Stem 19 inches; flower drooping; perianth 3 inches diameter, segments overlap for a third of their length, white; corona $\frac{3}{16}$ inch deep, cup shaped, cream margined with orange. Bulb small, of medium increase, not very free flowering. April 26 to May 16. Raised by Mrs. R. O. Backhouse.

NELLY (P. D. Williams), **H.C.**—Stem 19 inches, stiff; flower well posed; perianth 3½ inches diameter, segments regular, overlap for two-thirds of their length, white tinged with cream; corona ½ inch deep cup shaped, sulphur, margins broadly stained orange. Bulb small, of medium increase, not very free flowering. April 22 to May 7. Raised by sender.

LAUGHING WATER (Barr).—Stem 17 inches; flower drooping; perianth 3½ inches diameter, flat, segments overlap for half of their length, creamy-white; corona ½ inch deep, funnel shaped, clear sulphur-yellow. Bulb small, slow of increase, shy flowerer. April 14 to May 1. Raised by Messrs. Cartwright & Goodwin.

CORAL QUEEN (Barr).—Stem 16 inches; flower inclined to droop; perianth 2½ inches diameter, flat, segments overlap for a third of their length, creamy-white; corona $\frac{3}{16}$ inch deep, funnel shaped, sulphur edged dull orange. Bulb small, slow of increase, shy flowerer. April 24 to May 16. Raised by Rev. G. H. Engleheart.

Division 5.

Triandrus hybrids.

AWARD.

Harvest Moon, H.C. (*g.*) April 25, 1930. Raised by Rev. G. H. Engleheart and sent by Mr. W. B. Cranfield.

MAID MONICA (Cranfield).—Foliage somewhat spreading; stem 13 inches; flower drooping; perianth 3 inches diameter, segments incurving, overlap for half of their length, white faintly tinged cream; corona ½ inch deep, cup shaped, white tinged cream. Bulb small, of medium increase, not very free flowering. April 26 to May 16. Raised by Mr. H. Backhouse.

WHITE CORAL (Cranfield).—Foliage spreading; stem 14 inches; flower drooping; perianth 3 inches diameter, flat, segments overlap for half of their length, creamy-white; corona ½ inch deep, cup shaped, creamy-white. Bulb small, of medium increase, not very free flowering. April 24 to May 16. Raised by Mr. W. F. M. Copeland.

WATERFALL (Cranfield).—Foliage spreading; stem 14 inches; flower drooping; perianth 3 inches diameter, flat, segments overlap for a quarter of their length, creamy-white; corona ½ inch deep, funnel shaped, creamy-white. Bulb small, of medium increase, not very free flowering. April 16 to May 16. Raised by Rev. G. H. Engleheart (*5b*).

WAVELET (Cranfield).—Foliage spreading; stem 13 inches; flower drooping; perianth 3½ inches diameter, segments overlap for a quarter of their length, creamy-white; corona ½ inch deep, cup shaped, creamy-white. Bulb small, of medium increase, not very free flowering. April 26 to May 16. Raised by Rev. G. H. Engleheart.

ELIZABETH S. PRENTISS (P. D. Williams).—Stem 16 inches; flower drooping; perianth 3½ inches diameter, segments overlap for half of their length, somewhat pointed; corona $\frac{5}{16}$ inch deep, cup shaped, creamy-white. Bulb small, of medium increase, not very free flowering. April 24 to May 16. Raised by sender. *Leedsii* × *Triandrus*.

ACOLYTE (P. D. Williams).—Stem 16 inches; flower drooping; perianth 3½ inches diameter, segments overlap for half of their length, creamy-white; corona ½ inch deep, cup shaped, pale cream. Bulb small, of medium size, not very free flowering. April 22 to May 16. Raised by sender. Large *Leedsii* × *Triandrus*.

PRINCESS ENA (Bath).—Not vigorous; stem 12 inches; flower drooping; perianth 3½ inches diameter, segments reflexed, overlap for half of their length, creamy-white; corona 1½ inch deep, funnel shaped, sulphur. Bulb small, of medium increase, not very free flowering. April 24 to May 16. Raised by Messrs. C. G. van Tubergen.

HARVEST MOON (Cranfield), **H.C.**—Stem 15 inches; flower drooping; perianth 3½ inches diameter, segments reflexed, overlap for a quarter of their length, pale lemon yellow; corona 1⅛ inch deep, funnel shaped, pale lemon-yellow. Bulb small, of medium increase, not very free flowering. April 15 to May 5.

TRESKEWES (P. D. Williams).—Stem 16 inches; flower drooping; perianth 3½ inches diameter, segments somewhat reflexed, separated, bright lemon; corona 1¼ inch deep, funnel shaped, bright lemon. Bulb small, of medium increase, not very free flowering. April 14 to May 5. Raised by sender. 'King Alfred' × *Triandrus*.

Division 6.

Cyclamineus hybrids.

No new varieties have been added to this class since the last report.

Division 7.

Jonquilla hybrids.

AWARD.

Lanarth, A.M. (*g.*) April 11, 1930. Raised and sent by Mr. P. D. Williams.

Trevithian, A.M. (*g.m.*) April 10, 1931. Raised and sent by Mr. P. D. Williams.

Amoy, A.M. (*g.*) April 10, 1931. Raised and sent by Mr. A. J. Bliss.

Golden Sceptre, C. (*g.*) May 11, 1931. Raised by Messrs. de Graaff and sent by Messrs. Barr.

ODORUS RUGULOSUS MAXIMUS (Barr, Bath).—Foliage channelled; stem 17 inches; flower well posed; perianth 3 inches diameter, segments separated, bright lemon-yellow; corona ⅜ inch deep, funnel shaped, bright lemon-yellow, mouth expanded. Bulb small, slow of increase, shy flowerer. April 7 to May 7.

TARTARIN (Bliss).—Foliage channelled; stem 15 inches; flower well posed; perianth 2½ inches diameter, segments overlap at base only, inflexed, pale buttercup-yellow; corona 1 inch deep, funnel shaped, pale buttercup-yellow. Bulb small, slow of increase, shy flowerer. April 3 to May 7. Raised by sender. 'M. J. Berkeley' × 'Jonquil.'

AMOY (Bliss), **A.M.**—Foliage flat; stem 15 inches; flower well posed; perianth 2½ inches diameter, segments separated, bright lemon; corona $\frac{1}{10}$ inch deep, tubular, bright buttercup-yellow. Bulb small, of medium increase, free flowering. April 16 to May 16. Raised by sender. 'Monarch' × *N. Jonquilla*.

GOLDEN SCEPTRE (Barr), **C.**—Foliage flat; stem 19 inches; flowers well posed; perianth 2½ inches diameter, segments overlap for half of their length, bright buttercup-yellow; corona 1 inch deep, tubular, bright buttercup-yellow. Bulb small, of medium increase, free flowering. April 16 to May 16. Raised by Messrs. de Graaff.

LANARTH (P. D. Williams), **A.M.**—Foliage deeply channelled; stem 24 inches; flower well posed; perianth 2½ inches, flat, segments overlap for half of their length, clear buttercup-yellow; corona ½ inch deep, cup shaped, bright orange. Bulb small, of medium size, free flowering. April 2 to May 7.

TREVITHIAN (P. D. Williams), **A.M.**—Foliage rushlike, dark green; stem 18 inches; flower well posed; perianth 2½ inches diameter, flat, segments overlap for half of their length, clear buttercup-yellow; corona ½ inch deep, tubular, rich clear buttercup-yellow. Bulb of medium size and increase, not very free flowering. April 12 to May 7. Raised by sender. 'Pilgrim' × 'Jonquil.'

Division 8.

Tazetta hybrids.

AWARDS.

Kingcraft, A.M. (*g.*) May 5, 1930. Raised and sent by Mr. P. D. Williams.

St. Agnes, A.M. (*g.*) April 25, 1930. Raised and sent by Mr. P. D. Williams.

ST. BURYAN (P. D. Williams).—Stem 19 inches; flowers single or in pairs, free; perianth 2½ inches diameter, segments reflexed, overlap for half of their length, creamy-white, base yellow; corona ½ inch deep, saucer shaped, lemon edged orange-red. Bulb of medium size and increase. April 22 to May 7. Raised by sender.

KINGCRAFT (P. D. Williams), **A.M.**—Vigorous; stem 20 inches; flowers in pairs; perianth 2½ inches diameter, segments overlap for two-thirds of their length, creamy-white; corona $\frac{1}{10}$ inch deep, almost flat, bright orange. Bulb of medium size, rapid of increase, very free flowering. April 24 to May 16.

ST. AGNES (P. D. Williams), **A.M.**—Very vigorous; foliage somewhat drooping; flowers in pairs or threes; perianth 2¾ inches diameter, segments reflexed, overlap for half of their length, creamy-white; corona ½ inch deep, saucer shaped, bright orange-red. Bulb of medium size, rapid of increase, very free flowering. April 11 to May 1. 'Chaucer' × Polyanthus.

Division 9.

Poeticus varieties.

AWARDS.

Twin, A.M. (*m*). May 5, 1930. Raised and sent by Messrs. H. Prins, Wisbech.

Huon, A.M. (*m.*) May 5, 1930. Raised by Rev. G. H. Engleheart and sent by Mr. F. A. Secrett.

Sonata, A.M. (*g.m.*) May 11, 1931. Raised by Rev. G. H. Engleheart and sent by Messrs. Bath.

Fair Lady, A.M. (*g.*) April 27, 1931. Raised by Rev. G. H. Engleheart and sent by Messrs. Bath.

Caedmon, C. (*g.*) May 11, 1931. Raised by Rev. G. H. Engleheart and sent by Messrs. Barr.

PIRINI (Aldersey).—Foliage spreading; stem 18 inches; flower well posed; perianth 3½ inches diameter, segments separated, white; corona ½ inch deep, saucer shaped, sulphur narrowly edged with bright red. Bulb of medium size and increase, free flowering. April 26 to May 7. Raised by sender.

CARVETH (P. D. Williams).—Stem 20 inches; flower well posed; perianth 3½ inches diameter, segments somewhat reflexed, overlap for two-thirds of their length, white, cream base; corona ½ inch deep, basin shaped, bright sulphur edged bright red. Bulb small, of rapid increase, free flowering. April 26 to May 16. Raised by sender.

FAIR LADY (Bath), **A.M.**—Very vigorous; stem 18 inches, stiff; flower well posed; perianth 2½ inches diameter, segments somewhat reflexed, overlap for third of their length, white with cream base; corona $\frac{1}{10}$ inch deep, saucer shaped, sulphur edged scarlet. Bulb small, rapid of increase, free flowering. April 15 to May 7. Raised by Rev. G. H. Engleheart.

CHORISTER (Cranfield).—Stem 16 inches; flower drooping; perianth 2½ inches diameter, segments reflexed, overlapping, white; corona ½ inch deep, saucer shaped, sulphur narrowly edged red. Bulb small, rapid of increase, free flowering. May 5 to May 25. Raised by Rev. G. H. Engleheart.

LOCHRANZA (Barr).—Stem 14 inches; flower well posed; 2½ inches diameter, segments somewhat reflexed, overlap at base only, white; corona ½ inch deep, almost flat, sulphur with greenish centre shading to red at the margins. Bulb small, slow to increase, shy flowerer. April 28 to May 12. Raised by Mr. E. M. Crosfield.

PAPYRUS (Secrett).—Stem 16 inches; flowers well posed; perianth 2½ inches diameter, segments overlap for two thirds of their length, white, base lemon; corona $\frac{1}{10}$ inch deep, almost flat, greenish sulphur edged bright red. Bulb small, of medium increase, not very free flowering. April 28 to May 16. Raised by Rev. G. H. Engleheart.

VIRGIL (Bath).—Stem 19 inches; flower well posed; perianth 2½ inches diameter, segments overlap for a quarter of their length, somewhat reflexed, white; corona ½ inch deep, saucer shaped, sulphur, centre greenish, margins orange-red. Bulb small, of medium increase, free flowering. April 12 to May 7. Raised by Rev. G. H. Engleheart.

SONATA (Bath), **A.M.**—Tips of foliage drooping; stem 19 inches; flower well posed; perianth 2½ inches diameter, segments somewhat reflexed, overlap for two-thirds of their length, white, base lemon; corona ½ inch deep, almost flat, sulphur, centre greenish, margins bright red. Bulb small, slow to increase, not very free flowering. May 1 to May 19. Raised by Rev. G. H. Engleheart.

RHAPSODY (Bath).—Foliage spreading and drooping; stem 17 inches; flower well posed; perianth 2½ inches diameter, segments reflexed, overlap for two-thirds of their length, white, base lemon; corona ½ inch deep, saucer shaped, sulphur, centre green, margins broadly edged orange-red. Bulb small, slow of increase, shy flowerer. April 22 to May 7. Raised by Rev. G. H. Engleheart.

WIDEWING (Secrett).—Stem 18 inches; flower well posed; perianth 2½ inches diameter, segments reflexed, overlap for two-thirds of their length, white, base lemon; corona ½ inch deep, saucer shaped, deep sulphur, centre greenish,

margins narrowly edged bright red. Bulb of medium size, rapid of increase, free flowering. April 24 to May 16. Raised by Rev. G. H. Engleheart.

PRIORY PARK (Prins).—Stem 18 inches; flower well posed; perianth 2½ inches diameter, segments somewhat reflexed, overlap, white; corona ½ inch deep, almost flat, greenish-lemon edged bright red. Free flowering. May 1 to May 21. Raised by sender.

CAEDMON (Barr), C.—Stem 15 inches; flower well posed; perianth 2 1/10 inch deep, segments overlap for half of their length, white with sulphur base; corona 1/10 inch deep, saucer-shaped, greenish-lemon edged bright red. Bulb small, of medium increase, not very free flowering. April 28 to May 16. Raised by Rev. G. H. Engleheart.

TWIN (Prins), A.M.—Vigorous; stem 20 inches, stiff; flowers well posed, single or in pairs; perianth 2½ inches diameter, flat, segments overlap for half of their length, white with lemon base; corona ½ inch, almost flat, lemon edged bright red. Free flowering. May 1 to May 21.

SOCRATES (Barr).—Stem 15 inches; flower well posed; perianth 2½ inches diameter, segments overlap for two-thirds of their length, pure white; corona 1/10 inch deep, almost flat, lemon, edges serrated, deep scarlet. Bulb small, slow to increase, shy flowerer. April 26 to May 7. Raised by Rev. G. H. Engleheart.

KESTREL (Barr).—Stem 16 inches; flower well posed; perianth 2½ inches diameter, segments reflexed, overlap for a third of their length, white; corona 1/10 inch deep, almost flat, orange, centre greenish, margins bright red. Bulb small, slow to increase, not very free flowering. April 22 to May 7. Raised by Mr. P. D. Williams.

TIMON (Barr).—Stem 14 inches; flowers well posed; perianth 2 inches diameter, segments overlap for half of their length, white; corona 1/10 inch deep, almost flat, greenish-yellow edged bright red, margins frilled. Bulb small, slow to increase, free flowering. May 5 to May 19. Raised by Rev. G. H. Engleheart.

DINTON RED (Secrett).—Vigorous; foliage drooping at the tips; stem 20 inches; flowers occasionally in pairs, well posed; perianth 3 inches diameter, segments reflexed, overlap for half of their length, clear white; corona ½ inch deep, saucer shaped, dark greenish-orange shading to dark-red at the margins. Bulb of medium size and increase, free flowering. April 24 to May 7. Raised by Rev. G. H. Engleheart.

HUON (Secrett), A.M.—Vigorous; stem 18 to 20 inches; flower well posed; perianth 3½ inches diameter, segments overlap for two-thirds of their length, white with lemon base; corona ½ inch deep, almost flat, orange-yellow shading to white near the red margins. Free flowering. April 24 to May 16.

ORACLE (Barr).—Stem 16 inches; flower well posed; perianth 2½ inches diameter, segments reflexed, overlap for half of their length, white with cream base; corona ½ inch deep, saucer shaped, orange margined orange-red. Bulb small, slow to increase, shy flowerer. April 26 to May 12. Raised by Rev. G. H. Engleheart.

Division 10.

Double varieties.

AWARD.

Inglescombe, A.M. (*m.*) April 27, 1931. Raised by Mr. J. Walker and sent by Messrs. Bath.

NANETTE (Watts).—Stem 15 to 16 inches; flower inclined to droop; perianth 2½ inches diameter, white, corona ½ inch deep, white with cream base. Bulb of medium size, slow to increase, not very free flowering. April 25 to May 8. Raised by Mr. J. L. Richardson.

SNOW SPRITE (Barr).—Stem 14 inches; flowers well posed; perianth 2½ inches diameter, white, corona 1½ inches deep, white with cream base. Bulb small, of medium increase, not very free flowering. April 26 to May 21. Raised by sender. 'Artemis' × 'Horace.'

INGLESCOMBE (Bath), A.M.—Vigorous; stem 18 inches; flower well posed; perianth 2½ inches diameter, double, clear primrose, a shade darker than 'Primrose Phoenix.' Bulb of medium size and increase, not very free flowering. April 12 to May 5. Raised by Mr. J. Walker.

SUFFREN (Bliss).—Not vigorous; stem 16 inches, weak, flat; flower well posed; perianth 3 inches diameter, double, bright buttercup-yellow. Bulb of medium size, slow to increase, not very free flowering. April 10 to May 7. Raised by sender. 'Emperor' × *Telamonius plenus.*

FUCHSIAS TRIED AT WISLEY, 1928–31.

IN the following notes the Fuchsias (202) received for trial in 1928 have been divided into those best accommodated in the greenhouse, and those hardy enough to be grown outdoors in most parts of England. The latter (46 stocks) were planted out at Wisley in June 1928 and have remained where they were planted through the severe winter of 1928–29 with no more protection than a light covering of bracken can give. Though killed to the ground they came up and flowered well each year (p. 105).

Most of the greenhouse varieties are of garden origin, but one or two species are described. *Fuchsia arborescens* and *F. excorticata* died outdoors in the open, though the latter survived against a wall.

The cultivation of Fuchsias is by no means difficult, but it is well to keep them growing when in pots in their young stages, and care must, of course, be exercised with the watering. Fuchsias have to a certain extent gone out of fashion, and it is hoped that the trial, which attracted a great deal of admiration from visitors, and the list of awards given below will help to bring them back. Many of the greenhouse varieties are likely to prove hardy outdoors in districts climatically favoured.

AWARDS, DESCRIPTIONS, AND NOTES.

Greenhouse Varieties.

Sepals and petals blush.

Semi-double.

COUNTESS OF ABERDEEN (Dobbie, Forbes).—Habit erect, very compact, not vigorous; sepals ¾ inch long, blush; petals ¾ inch wide and long, white tinged with blush; tube blush.

Sepals white flushed carmine, petals creamy-white.

Semi-double.

ROLLA (Dobbie).—Rather weak and spreading; sepals 1¼ inch long, reflexed, white flushed carmine; petals 1¼ inch diameter, ¾ inch long, creamy-white; tube carmine on white.

Sepals creamy-wax, petals rose.

Single.

COVENT GARDEN WHITE (Jones).—Spreading and vigorous; sepals 1¼ inch long, reflexed at the tips, creamy-wax; petals 1 inch diameter, 1 inch long, rose; tube creamy-wax. Foliage medium green.

Sepals waxy-pink, petals rose.

Single.

AWARD.

Mrs. Marshall, A.M. July 25, 1929. Royal Horticultural Society and also sent under the names of 'Grande Duchess Marie' and 'Leonardo da Vinci' by Messrs. H. J. Jones, Lewisham, S.E.; these share the Award.

ROSE OF DENMARK (Jones).—Of spreading habit, vigorous; sepals 1 inch long, recurved, waxy pink; petals ¾ inch diameter, ½ inch long, rose-pink; tube waxy-cream. Foliage very dark green.

MRS. MARSHALL, **A.M.**—Of erect, spreading habit, very vigorous; sepals 1¼ inch long, reflexed at the tips, waxy cream-pink; petals ¾ inch diameter, ½ inch long, rosy-cerise; tube creamy-wax. Foliage medium green. Sent in error as 'Leonardo da Vinci.'

GRANDE DUCHESS MARIE (Jones), **A.M.**—Identical with 'Mrs. Marshall.'

Semi-double.

PINK PEARL (Dobbie).—Of very spreading habit, vigorous; sepals 1 inch long, incurved, waxy pink; petals ⅞ inch diameter, ½ inch long, old rose; tube waxy pink. Also sent by Messrs. Dobbie as 'Gertrude Pearson.'

Sepals cream-pink, petals salmon-pink.

Single.

T. BONSTEDT (Jones).—Not vigorous; sepals ½ inch long, horizontal, waxy cream-pink, tips cream; petals ½ inch diameter, ⅜ inch long, salmon-pink; tube waxy cream-pink, elongated. Foliage large, medium green.

Sepals wax, petals rosy-red.

Single.

PRINCESS MAY (Carter Page).—Compact, erect, vigorous; sepals 1 inch long, recurved, wax; petals ¾ inch diameter, ⅝ inch long, rosy-red; tube wax.

LUSTRE (Dobbie).—Spreading, vigorous; sepals ½ inch long, recurved, waxy blush-white; petals ⅝ inch diameter, ½ inch long, rosy-red; tube waxy blush-white. Foliage medium green.

LUSTRE IMPROVED (Carter Page).—Characters of 'Lustre,' except that the flowers are somewhat larger.

JUBILEE (Forbes).—Characters of 'Lustre,' but of more vigorous habit and flowers much larger.

AMY LYE (Dobbie).—Somewhat spreading, vigorous; sepals 1¼ inch long, recurved, waxy blush; petals ⅞ inch diameter and long, rosy-red; tube waxy.

Sepals waxy-pink, petals red.

Single.

AWARDS.

Balkon, H.C. July 25, 1929. Sent by Messrs. H. J. Jones, Lewisham, S.E.
Earl of Beaconsfield, H.C. July 25, 1929. Sent by Messrs. Dobbie, Edinburgh.

BALKON, **H.C.**—Main growth erect, side growths trailing; vigorous; sepals 1 inch long, waxy pale rose; petals ⅝ inch diameter, ½ inch long, rosy-red; tube waxy cream-pink. Suitable for hanging baskets.

DOCTOR (Castle Nurseries).—Erect, vigorous; sepals 1¼ inch long, recurved, waxy pale rose; petals ¾ inch wide and long, rosy pillar-box red; tube waxy pale rose. Foliage medium green.

MRS. RUNDLE (R.H.S., Cory).—Erect, vigorous; sepals ¾ inch long, drooping, waxy pale rose; petals ½ inch diameter and long, vermilion; tube waxy pale rose.

EARL OF BEACONSFIELD, **H.C.**—Erect, vigorous; sepals 1¼ inch long, horizontal, deep waxy pink; petals ½ inch diameter, ⅜ inch long, deep vermilion; tube deep waxy pink. Foliage large, medium green.

Sepals cerise, petals creamy-white.

Single.

GEM (Jones).—Compact, erect, vigorous; sepals $\frac{8}{10}$ inch long, cerise; petals 1 inch diameter, ½ inch long, creamy-white; tube cerise.

Sepals cerise, petals white and cerise.

Single.

FLOCON DE NEIGE (Dobbie).—Somewhat spreading, vigorous; sepals 1 inch long, scarlet-cerise; petals 1¼ inch diameter, ⅞ inch long, creamy-white veined cerise; tube scarlet-cerise.

FERDINAND MAHLUKE (Carter Page).—Identical with 'Flocon de Neige.'

ALICE HOFFMAN (Dobbie).—Of compact, erect habit, vigorous; sepals $\frac{9}{10}$ inch long, cerise; petals $\frac{1}{2}$ inch diameter, $\frac{1}{2}$ inch long, white, veined cerise at the base; tube reddish-cerise; very free flowering. Useful for baskets.

Semi-double.

AWARD.

Dainty Lady, A.M. July 25, 1929. Sent by Messrs. Dobbie and Messrs. Carter Page, London Wall, E.C.

DAINTY LADY, **A.M.**—Somewhat spreading, vigorous; sepals $1\frac{1}{2}$ inch long, cerise; petals $1\frac{1}{2}$ inch diameter, $1\frac{1}{2}$ inch long, pinkish-white veined cerise towards the base; tube cerise. Also sent by Messrs. Dobbie as 'La France.'

SNOWCAP (Jones).—Habit spreading; vigorous; sepals 1 inch long, cerise; petals $\frac{7}{8}$ inch diameter, $\frac{7}{10}$ inch long, white, veined cerise at the base; tube reddish-cerise.

Double.

AWARDS.

Ballet Girl, A.M. July 25, 1929. Sent by Messrs. Forbes, Hawick, and Messrs. Carter Page.

White Phenomenal, H.C. July 25, 1929. Sent by Messrs. Forbes.

Fascination, H.C. July 25, 1929. Raised by Mr. H. B. May. Sent by Mr. G. Carpenter, Byfleet, Messrs. Ladds, Swanley, and the Castle Nurseries, Chingford, E. Also sent as 'Rose Ballet Girl' by Messrs. Carter Page, this shares the award.

CASTLE BEAUTY (Castle Nurseries).—Habit somewhat spreading, fairly vigorous; sepals 1 inch long, cerise; petals $1\frac{1}{2}$ inch diameter, $\frac{1}{2}$ inch long, white, veined cerise, flushed cerise at the base; tube cerise. Raised by senders.

MOLESWORTH (Dobbie).—Habit spreading and somewhat trailing; sepals 1 inch long, bright cerise; petals $1\frac{1}{2}$ inch diameter, 1 inch long, white, veined cerise at the base; tube bright cerise. Foliage medium green.

MRS. ALLARD (John Innes Institution).—Characters of 'Molesworth.'

BELLA FORBES (Forbes).—Habit somewhat spreading, vigorous; sepals $1\frac{1}{10}$ inch long, much reflexed, bright cerise; petals $1\frac{1}{2}$ inch diameter, $\frac{9}{10}$ inch long, creamy-white middle suffused cerise; tube bright cerise.

DUCHESS OF EDINBURGH (Dobbie).—Much resembles 'Bella Forbes' but petals $1\frac{1}{2}$ inch long, white, veined and flushed cerise.

BALLET GIRL, **A.M.**—Habit spreading, vigorous; sepals 1 inch long, reflexed, cerise; petals $1\frac{1}{2}$ inch diameter, $\frac{9}{10}$ inch long, white veined cerise towards the base, base suffused cerise; tube cerise. Also sent as 'Cupid' by Mr. Auton.

NAUTILUS (Dobbie).—Habit spreading; vigorous; sepals $1\frac{1}{2}$ inch long, cerise; petals 2 inches diameter, $1\frac{1}{2}$ inch long, white veined carmine; tube cerise.

PHRYNE (Forbes).—Much like 'Nautilus' but sepals somewhat shorter, $1\frac{1}{2}$ inch long, and petals white veined carmine and flushed carmine at the base.

DAVID ALSTON (Forbes).—Habit spreading; vigorous; sepals $1\frac{1}{2}$ inch long, reflexed and curled, scarlet-cerise; petals 2 inches diameter, 1 inch long, white veined and flushed magenta; tube scarlet-cerise. Foliage medium to dark green, large.

PASTEUR (Jones).—Of erect habit, vigorous; sepals $1\frac{1}{10}$ inch long, cerise; petals 2 inches diameter, 1 inch long, loosely arranged, white veined carmine; tube cerise.

SYLVIA (R.H.S.).—Habit somewhat spreading, vigorous; sepals $1\frac{1}{2}$ inch long, scarlet-cerise; petals $1\frac{1}{2}$ inch diameter, 1 inch long, white veined and flushed cerise; tube scarlet-cerise; bud heart-shaped.

WHITE PHENOMENAL, **H.C.**—Habit erect and spreading; very vigorous; sepals $1\frac{1}{2}$ inch long, somewhat reflexed, scarlet-cerise; petals 2 inches diameter, 1 inch long, white flushed and veined cerise; tube scarlet-cerise.

MISS B. HESSE (Jones).—Habit erect and compact, not very vigorous; sepals $\frac{7}{8}$ inch long, scarlet-cerise; petals $1\frac{1}{2}$ inch diameter, $\frac{7}{8}$ inch long, blush veined carmine; tube scarlet-cerise.

FASCINATION, **H.C.**—Habit spreading, vigorous; sepals $1\frac{1}{2}$ inch long, cerise; petals $2\frac{1}{2}$ inches diameter, $1\frac{1}{2}$ inch long, pale pink veined carmine; tube cerise; very free flowering.

ROSE BALLET GIRL, **H.C.**—See above.

Sepals cerise, petals carmine.

Single.

AWARD.

Display, H.C. July 25, 1929. Sent by Messrs. Carter Page.

DISPLAY, **H.C.**—Of erect habit, very vigorous; sepals 1¼ inch long, somewhat reflexed, dull cerise; petals 1¼ inch diameter, 1 inch long, bright carmine; tube reddish-cerise; very free-flowering.

Sepals cerise, petals rosy-cerise; foliage variegated.

Single.

AWARD.

Sunray, A.M. July 25, 1929. Sent by Messrs. Carter Page, Forbes.

SUNRAY, **A.M.**—Spreading, vigorous; foliage medium green overlaid and variegated with cerise, margins cream often flushed cerise; sepals 1 inch long, horizontal, bright glowing cerise; petals ¾ inch diameter and long, rich rosy-cerise; tube bright glowing cerise; not very free flowering.

Sepals pink, petals salmon; bud elongated.

Single.

AWARD.

Andenken a. H. Henkel, A.M. July 25, 1929. Sent by Messrs. Dobbie, Edinburgh.

SWANLEY YELLOW (Dobbie).—Fairly erect, not vigorous; sepals 1¼ inch long, horizontal, waxy pink; petals ¾ inch diameter and long, rich salmon-orange; tube waxy pink.

PRINCE OF ORANGE (Dobbie).—Erect, vigorous; sepals 1¼ inch long, horizontal, waxy rose-pink; petals 1 inch diameter, ⅝ inch long, expanded, orange-salmon; tube waxy rose-pink.

ANDENKEN A. H. HENKEL, **A.M.**—Spreading, vigorous; sepals ¾ inch long, drooping, waxy rose; petals ¾ inch diameter and long, salmon; tube very long, waxy pale rose. Foliage large, very dark green.

Sepals and petals salmon; bud elongated.

Single.

AWARDS.

Coralle, A.M. July 25, 1929. Sent by Messrs. H. J. Jones and Mr. R. Cory.
Aurora superba, H.C. July 25, 1929. Sent by Messrs. H. J. Jones.

CORALLE, **A.M.**—Spreading, vigorous; sepals ¾ inch long, drooping, orange-salmon; petals ¾ inch diameter and long, orange-salmon; tube very long, orange-salmon. *F. fulgens* type.

FULGENS (Cory).—Like last, foliage large, dark dull green, veined purplish-red; sepals salmon-orange, tips green; petals ¾ inch diameter, ½ inch long, salmon-orange; tube very long, salmon-orange.

FULGENS (Carpenter).—Characters of the last but foliage medium green; sepals salmon-cerise, tips cream; petals salmon; tube salmon-cerise.

AURORA SUPERBA, **H.C.**—Spreading, vigorous; sepals 1¼ inch long, almost horizontal, waxy pale salmon, tips green; petals ¾ inch diameter and long, orange-salmon narrowly edged purple; tube waxy pale salmon.

Sepals and petals orange-scarlet; bud elongated.

Single.

AWARD.

Gartenmeister Bonstedt, H.C. July 25, 1929. Sent by Messrs. Forbes; also included by the Royal Horticultural Society as 'Late Perfection,' this shares the award.

THALIA (Castle Nurseries).—Erect, vigorous; foliage large, very dark green, midrib bronzy-red; sepals ¾ inch long, orange-scarlet; petals 1¼ inch diameter, ½ inch long, orange-red; tube very long, orange-scarlet.

GARTENMEISTER BONSTEDT, **H.C.**—Much like 'Thalia,' but plant more vigorous; flowers and foliage of a deeper shade. Also entered as 'Late Perfection' from the R.H.S.

TRIPHYLLA VAR. (Cory).—Spreading habit, vigorous; foliage very dark dull green; sepals ½ inch long, drooping, orange-scarlet; petals ½ inch diameter and long, orange-scarlet; tube very long, orange-scarlet.

Sepals and petals scarlet; bud elongated.

Single.

CORYMBIFLORA (Forbes).—Spreading, not vigorous; foliage very dark dull green; sepals ½ inch long, horizontal, bright scarlet-crimson; petals ½ inch diameter, ½ inch long, bright scarlet; tube very long, bright scarlet-crimson.

Sepals and petals red.

Single.

AWARD.

Marinka, A.M. July 25, 1929. Sent by Messrs. Jones.

MARINKA, **A.M.**—Erect, very vigorous; sepals 1 inch long, recurved at the tips, crimson-scarlet; petals ½ inch diameter, ½ inch long, expanded, rosy-scarlet; tube crimson-scarlet; very free flowering.

VALIANT (Jones).—Spreading habit, vigorous; sepals 1 ⅛ inch long, almost horizontal, bright rich scarlet; petals ½ inch diameter, 1½ inch long, rosy-red; tube bright rich scarlet. Foliage medium green. Also sent by Messrs. Jones as 'Robinson,' a misnomer.

Sepals cerise, petals mauve.

Semi-double.

AWARD.

Mauve Beauty, A.M. July 25, 1929. Sent by the Castle Nurseries, Chingford, and Messrs. Dobbie, Edinburgh.

MAUVE BEAUTY, **A.M.**—Pyramidal; vigorous; sepals 1 inch long, recurved, cerise; petals 1½ inch diameter, ¾ inch long, mauve-pink; tube cerise.

Sepals pink, petals purple.

Single.

AWARD.

Rose of Castille, H.C. July 25, 1929. Included by the Royal Horticultural Society and sent by Messrs. Forbes, Carter Page, as 'Rose of Castille Improved,' and by Sir W. Lawrence, Bt., as 'Carmen.' These share the award.

ROSE OF CASTILLE, **H.C.**—Tall spreading, very vigorous; foliage large, medium green; sepals 1½ inch long, drooping, waxy rose-pink, tips greenish; petals ¾ inch diameter, 1 inch long, opening violet-purple passing to rosy-magenta; tube waxy blush.

ROSE OF CASTILLE IMPROVED, **H.C.**—Characters of 'Rose of Castille.'

CARMEN, **H.C.**—Characters of 'Rose of Castille.' Two stocks sent as 'Scarcity' and 'Killiecrankie' from Messrs. Forbes were similar to this.

Sepals red, petals purple.

Single.

AWARDS.

Emile Zola, A.M. July 25, 1929. Sent by Messrs. J. Forbes, Hawick.

Masterpiece } **A.M.** July 25, 1929. { Sent by Messrs. Forbes.
Le Robuste } { Sent by Messrs. H. J. Jones.

Charming, A.M. July 25, 1929. Sent by Messrs. Dobbie, Ladds, and Cory.

Clipper, H.C. July 25, 1929. Sent by Messrs. Forbes.

Princess Mary, H.C. July 25, 1929. Sent by Messrs. Jones.

Golden Treasure, H.C. July 25, 1929. Sent by Messrs. Dobbie and Messrs. Forbes.

EMILE ZOLA, **A.M.**—Bushy, vigorous; sepals 1 inch long, reflexed, scarlet-cerise; petals 1¼ inch diameter, ½ inch long, expanded, bright rosy-magenta; tube scarlet-cerise; very free flowering.

DUKE OF YORK (Jones).—Spreading habit, vigorous; sepals 1 inch long, almost horizontal, cerise; petals ¾ inch diameter and long, bluish-magenta; tube cerise.

ABUNDANCE (Jones).—Spreading, vigorous; sepals 1 inch long, scarlet-cerise; petals ¾ inch diameter, ⅞ inch long, magenta; tube scarlet-cerise.

MASTERPIECE, **A.M.**—Erect, bushy, very vigorous; sepals 1 inch long, reflexed, scarlet-cerise; petals 1 inch diameter, 1¼ inch long, magenta; tube scarlet-cerise; very free flowering.

LE ROBUSTE, **A.M.**—Like 'Masterpiece.'

WAVE OF LIFE (Jones).—Spreading habit, vigorous; sepals ¾ inch long, almost horizontal, cerise; petals ¾ inch diameter, ⅞ inch long, magenta; tube pale cerise; not free flowering. Foliage yellowish green.

COLENSOI (Langworthy).—Tall and spreading, vigorous; sepals ¾ inch long, horizontal, scarlet; petals ⅞ inch diameter, ¾ inch long, magenta; tube scarlet. Foliage medium green.

CLIPPER, **H.C.**—Very tall and spreading; sepals 1¼ inch long, much reflexed, cerise; petals ¾ inch diameter and long, magenta; tube pale cerise; very free flowering. Foliage large, medium green.

PRESIDENT (Dobbie).—Bushy, fairly vigorous; sepals 1¼ inch long, reflexed, cerise; petals 1¼ inch diameter, 1 inch long, expanded, opening royal-purple passing to magenta; tube cerise.

PRINCESS MARY, **H.C.**—Erect, bushy, vigorous; sepals 1 inch long, much reflexed, scarlet; petals 1 inch diameter and long, pale rosy-purple; tube scarlet; very free flowering.

CHARMING, **A.M.**—Tall, bushy, very vigorous; sepals 1¼ inch long, recurved at the tips, reddish-cerise; petals ¾ inch diameter, 1⅛ inch long, dull rosy-purple; tube reddish-cerise; very free flowering. Also sent as 'Display' in error by Messrs. Jones. No. 3 sent by Mr. R. Cory was like this.

DUKE OF CONNAUGHT (Carter Page).—Somewhat spreading, vigorous; sepals 1¼ inch long, recurved at the tips, scarlet; petals ⅞ inch diameter, 1 inch long, opening violet-purple passing to purplish-magenta; tube scarlet.

MAGNET (Forbes).—Spreading, vigorous; sepals 1¼ inch long, reflexed, scarlet-cerise; petals 1 1/10 inch diameter, 1⅛ inch long, purplish-magenta; tube scarlet-cerise; not very free flowering.

GOLDEN TREASURE, **H.C.**—Erect, bushy, vigorous; sepals 1¼ inch long, recurved at the tips, scarlet; petals ¾ inch diameter, 1 inch long, purplish-magenta; tube scarlet. Foliage yellowish-green variegated with pale yellow.

JOHN FRENCH (Ladds).—Spreading, vigorous; sepals 1 inch long, reflexed, scarlet-cerise; petals 1¼ inch diameter, ⅞ inch long, expanded, bright Bishop's purple; tube scarlet-cerise. 'Isabelle' as sent by Messrs Jones, and 'Andrew Carnegie' as sent by Messrs. Forbes were like this, but these were erroneously named.

TRY-ME-OH (Jones).—Characters of 'John French.'

TRAILING QUEEN (Forbes).—Trailing, vigorous; sepals 1¼ inch long, almost horizontal, bright cerise; petals ⅞ inch diameter, ¾ inch long, dull violet-magenta; tube cerise.

ROYAL PURPLE (Castle Nurseries).—Spreading, not very vigorous; sepals 1 inch long, horizontal, bright scarlet; petals ¾ inch diameter, ⅞ inch long, violet-purple; tube bright scarlet; not very free flowering.

DUNROBIN BEDDER (Forbes).—Dwarf spreading, vigorous; sepals ¾ inch long, horizontal, bright scarlet; petals ⅝ inch diameter, ¾ inch long, violet-purple; tube bright scarlet.

Semi-double.

MINOS (Forbes).—Somewhat spreading, not very vigorous; sepals ⅞ inch long, much reflexed, scarlet-cerise; petals 1¼ inch diameter, 1 inch long, rosy-magenta; tube scarlet-cerise; not very free flowering.

ELSA (Jones).—Somewhat spreading, vigorous; sepals 1¼ inch long, almost horizontal, waxy rose-pink, tips greenish; petals 1 inch diameter, ⅞ inch long, dull rosy-magenta; tube waxy pale rose-pink.

TITIAN (Forbes).—Erect, bushy, vigorous; sepals 1¼ inch long, reflexed, scarlet-cerise; petals 1¼ inch diameter and long, dull Bishop's purple; tube scarlet-cerise.

Double.

AWARD.

Beauty, H.C. July 25, 1929. Sent by Messrs. Forbes, Hawick.

ESMERALDA (Jones).—Spreading, vigorous; sepals 1 inch long, recurved at the tips, cerise; petals 1¼ inch diameter, 1 inch long, opening purplish-mauve passing to mauve; tube cerise. Foliage large, medium green.

ROSE PHENOMENAL (Forbes).—Erect, bushy, vigorous; sepals 1½ inch long, incurving, scarlet; petals 1¼ inch diameter, 1 inch long, purplish-mauve; tube scarlet. Foliage large, medium green.

CREPUSCULE (Jones).—Habit of 'Rose Phenomenal'; sepals ¾ inch long, incurved, scarlet; petals 2 inches diameter, ⅞ inch long, rosy magenta; tube scarlet.

BEAUTY, H.C.—Tall, erect, bushy, very vigorous; sepals 1½ inch long, much reflexed, scarlet; petals 2¼ inches diameter, 1¼ inch long, bright rosy-magenta; tube scarlet; very free-flowering.

DE CHERVILLE (Jones).—Much like 'Beauty' but flower stems less tinged with red and flowers much smaller.

PHENOMENAL (Forbes, Carter Page).—Habit erect and spreading, vigorous; sepals 1 inch long, incurving, deep cerise; petals 1¼ inch diameter, 1 inch long, opening bluish-purple passing to purplish-magenta; tube deep cerise.

HERON (Jones).—Of erect, somewhat spreading habit; vigorous; sepals 1 inch long, much reflexed, scarlet; petals 2 inches diameter, 1½ inch long, opening purplish-magenta passing to magenta; tube scarlet.

GUY DAUPHINE (Jones).—Much like 'Heron' but a ragged flower.

SAPHIR (Jones).—Much like 'Heron' but habit less spreading and flowers when first open darker.

MRS. GIDEON BROWN (Forbes).—Much resembles 'Heron,' but dwarfer and more spreading; flowers smaller with darker sepals and tube.

LIMA (Jones).—Much like 'Heron' but taller and flowers somewhat smaller with incurved sepals; otherwise similar.

BLUE GOWN (Jones).—Habit spreading, not vigorous; sepals 1½ inch long, reflexed, cerise; petals 1¼ inch diameter, ⅞ inch long, rosy-blue; tube cerise.

CORNELIA (Forbes).—Of erect bushy habit, vigorous; sepals ⅞ inch long, recurved, cerise; petals 1¼ inch diameter, 1 inch long, bluish-purple; tube cerise.

AVALANCHE (Dobbie).—Of spreading habit, vigorous; foliage large, medium green; sepals 1½ inch long, reflexed, cerise; petals 1 inch diameter, ¾ inch long, opening violet-purple passing to Bishop's purple; tube cerise.

JOHN FORBES (Forbes).—Of dwarf spreading habit; sepals 1 inch long, drooping, scarlet; petals 1¼ inch diameter, 1 inch long, opening royal-purple passing to dull Bishop's purple; tube scarlet.

GERBERT (Jones).—Of tall spreading habit, vigorous; foliage medium green; sepals ¾ inch long, reflexed, scarlet-cerise; petals 1¾ inch diameter, 1 inch long, opening royal purple streaked scarlet passing to magenta streaked scarlet; tube scarlet-cerise; a ragged flower.

CARILLON (Dobbie).—Much like 'Gerbert' but habit less spreading and flowers somewhat smaller. Also sent as 'Charles Garnier,' 'Aphland,' by Messrs. Jones. 'Madame Lantelme' and 'Emma Calve' also sent by Messrs. Jones were like this variety, but were erroneously named.

PRINCESS DOLLAR (Jones).—Of very spreading dwarf habit; sepals ¾ inch long, reflexed, scarlet-cerise; petals 1¼ inch diameter, ⅝ inch long, purplish-magenta; tube scarlet-cerise.

C. CARRINGTON (Jones).—Habit spreading, vigorous; sepals 1 inch long, much reflexed, scarlet-cerise; petals 1 inch diameter, ⅞ inch long, opening pale royal purple passing to purplish-magenta; tube scarlet-cerise.

Hardy Varieties.

Sepals red, petals purple.

Single.

AWARDS.

Thompsonii, A.M. August 19, 1929. Sent by Messrs. R. Veitch, Exeter.

gracilis, H.C. August 19, 1929. Sent by Messrs. J. Cheal, Crawley, Sussex, and Messrs. J. Forbes.

americana, H.C. August 19, 1929. Sent by Sir W. Lawrence, Bt., Burford, Dorking.

PUMILA (Stewart, Forbes, Carter Page).—Of very dwarf compact habit; sepals ½ inch long, deep scarlet; petals ½ inch diameter, $\frac{3}{10}$ inch long, deep purple; tube deep scarlet.

TOM THUMB (Therkildsen).—Like 'pumila.'

GRACILIS VARIEGATA (Stewart, Forbes, Carter Page).—Of medium height, spreading habit; foliage small, pale green broadly edged with pale cream; sepals $\frac{1}{10}$ inch long, bright scarlet; petals ½ inch diameter, ½ inch long, purple; tube scarlet.

GRACILIS, **H.C.**—Tall spreading habit with arching slender stems; sepals ¾ inch long, bright scarlet; petals ½ inch diameter, ¾ inch long, purple; tube scarlet. Also sent by Mr. R. Cory, but this was mixed with 'Thompsonii.'

THOMPSONII, **A.M.**—Tall, erect, bushy habit; sepals ¾ inch long, bright scarlet; petals ½ inch diameter, $\frac{3}{10}$ inch long, purple; tube scarlet.

AMERICANA, **H.C.**—Much like 'Thompsonii,' but taller and flowers somewhat smaller.

AMERICANA ELEGANS (Cheal).—Like 'Americana' but with paler and duller flowers.

MACROSTEMMA GLOBOSA (Stewart).—Tall, erect, bushy habit with stout stems; sepals ¾ inch long, drooping, bright scarlet; petals $\frac{3}{10}$ inch diameter, ½ inch long, rich purple; bud globular; tube scarlet.

GLOBOSA (Carter Page, Cory, Forbes).—Like the last.

RICCARTONII (Forbes, Cheal).—Much like 'macrostemma globosa,' but with larger flowers which are very freely borne.

COCCINEA FLORIAN (Jones).—Of medium height, habit bushy; sepals ¾ inch long, cerise; petals ¾ inch diameter, ¾ inch long, purplish-magenta; tube cerise.

LANSDOWNE (R. Veitch).—Of spreading and trailing habit; foliage large; sepals 1¼ inch long, cerise; petals 1¼ inch diameter, 1 inch long, magenta.

MADAME CORNEILSON (Cheal).—Much like 'Lansdowne,' but with smaller flowers.

CALEDONIA (Forbes, R. Veitch, Dobbie, Langworthy).—Of medium height, bushy habit; foliage large; sepals ¾ inch long, reddish-cerise; petals ¾ inch diameter, ¾ inch long, magenta; very free flowering.

DRAME (Cheal).—Erect, bushy, not vigorous; foliage large, dark dull green; sepals 1½ inch long, scarlet; petals ¾ inch diameter, ¾ inch long, rosy-magenta; not free flowering.

RONSARD (R. Veitch).—Spreading, not vigorous; sepals 1 inch long, cerise; petals ¾ inch diameter, and long, royal purple tinged magenta, not very free flowering.

CORALLINA (R. Veitch, Cheal, Forbes).—Spreading with arching stems; foliage large, dark dull green; sepals $\frac{9}{10}$ inch long, very bright scarlet; petals ¾ inch diameter, ½ inch long, purple. 'L'Enfant Prodigue' sent by Sir W. Lawrence, Bt., was similar to this variety.

Semi-double.

MARVEL (Jones).—Spreading; foliage small, medium green; sepals ¾ inch long, cerise; petals ¾ inch diameter and long, royal-purple; not very free flowering.

PRODIGY (Forbes).—Spreading; foliage large, dark green; sepals ¾ inch long, cerise; petals ¾ inch diameter, ¾ inch long, royal-purple; not very free flowering. 'Volunteer,' sent by Messrs. Forbes, was like this variety but was erroneously named.

TELEGRAPH (R. Veitch).—Like 'Prodigy.'

DRAMA (R. Veitch).—Compact, erect, not vigorous; sepals $\frac{7}{10}$ inch long, bright scarlet; petals $\frac{9}{10}$ inch diameter, $\frac{7}{10}$ inch long, bright purple; not very free flowering.

Species not hardy.

Single.

SERRATIFOLIA (R. Veitch).—Spreading habit, not vigorous; foliage very dark green; sepals ½ inch long, incurved, pale green; petals ¾ inch diameter, and long, terra-cotta; tube carmine; bud elongated; not free flowering.

PROCUMBENS (Forbes).—Trailing and prostrate; foliage small, heart-shaped, medium green; sepals ¼ inch long, reflexed, brown; petals none; tube creamy-blush; filaments red, stamens blue; berry glaucous-red. Suitable for baskets.

HEMEROCALLIS TRIED AT WISLEY, 1929–31.

ONE hundred and seventeen stocks, usually of three plants each, were collected from various sources for comparison in this trial, but three, only received in 1930—Wau-ban, Mikado, and Cinnabar—have not been long enough in cultivation at Wisley to report upon and are not referred to below, and two or three of the stocks that failed to become established are also omitted.

The plants were grown in a long border on the east side of the Paeony ground at Wisley and for the most part made good growth. Like Pæonies they take some time to become well-established and are the better for being undisturbed. They should therefore be planted where they are not likely to be liable to removal for some years. They make excellent plants for growing in grass provided the soil is moist.

The varieties are divided in the Report into two groups, the early varieties, flowering mainly in May and June, and the late varieties, flowering mainly from July onwards.

AWARDS, DESCRIPTIONS, AND NOTES.

Early Varieties.

Flowers lemon.

AWARD.

flava, A.M. June 10, 1931. Sent by the Royal Horticultural Society, Wisley; also sent by Messrs. H. den Ouden, Boskoop, Holland, as **flava major,** this shares the award.

FLAVA (R.H.S.), **A.M.**—Very vigorous; forming somewhat dense clumps, with dark green, arching foliage, 2 feet in height; spreading by underground stolons. Flower stems, 3½ feet tall, erect, somewhat closely branched near the top; 8- to 12-flowered. Flowers 3½ inches diameter, short funnel-shaped, clear lemon-yellow; scented; petals overlap for half of their length. Seeds freely produced in globular capsules, large. Flowering very freely from May 25 to July 3.

FLAVA MAJOR (den Ouden), **A.M.**—Identical with 'flava.'

FLAVA MAJOR (Barr).—Very similar to 'flava' except that the foliage is a shade darker and the apex of the petals much more reflexed and the margins very wavy. Did not set seeds.

HIPPEASTRUM (Perry).—Habit similar to 'flava' with paler foliage. Flowers 3½ inches diameter, starry, lemon, greenish down in the throat, scented; petals narrow and separated, reflexed. Very few capsules produced containing small seeds. Flowering very freely from June 18 to July 24.

GRAMINEA (Prichard).—The plants form dwarf dense clumps with spreading, medium green, grasslike foliage, 9 inches in height, which is deciduous. Flower stems 10 inches in length, spreading outwards, very shortly and closely branched at the apex; 2- to 5-flowered. Flowers 2¾ inches diameter, short funnel-shaped, somewhat star-like, lemon, reverse of outer petals flushed with brown. Small seeds sparsely produced in oval capsules. Flowering sparsely from May 18 to June 16.

WINSOME (G. Yeld).—Vigorous; forming dense clumps, with medium green, erect foliage, 30 to 34 inches in height. Flower stems erect and just topping the foliage, closely branched near the apex, 6- to 10-flowered. Flowers 3½ inches

diameter, flat funnel-shaped, pale creamy-lemon, reverse of outer petals tinged pale brown, tips somewhat reflexed; scented. Did not set seeds. Flowering freely from June 12 to July 13.

Flowers apricot-yellow.

AWARDS.

Shirley, A.M. June 10, 1931. Sent by Messrs. B. Ruys, Dedemsvaart, Holland.

Semperflorens, A.M. July 17, 1931. Sent by Messrs. M. Prichard, Christchurch, Hants.

Apricot, A.M. June 10, 1931. Raised by Mr. G. Yeld, V.M.H., and sent by Messrs. Barr, King St., Covent Garden, W.C.

Sovereign, A.M. July 17, 1931. Sent by Messrs. Barr, den Ouden, Ruys.

Queen of May, H.C. June 10, 1931. Raised and sent by Messrs. van Veen, Leiden, Holland, also sent by Messrs. Barr, den Ouden, Ruys, Perry of Enfield, Middlesex, and the Royal Horticultural Society, Wisley.

Golden Bell, H.C. July 17, 1931. Sent by Messrs. Ruys.

MIRANDA (G. Yeld).—Plant vigorous, forming dense tufts, with medium yellowish-green, arching foliage, 30 inches tall. Flower stems erect, 42 inches tall, very widely branched just above the middle, 9- to 24-flowered. Flowers 4¼ inches diameter, funnel-shaped, soft apricot, reverse darker, fading, petals of medium width, wavy at the margins. Seeds very sparsely produced. Flowering from May 30 to August 5. Raised by sender. *flava* × *aurantiaca*.

SHIRLEY (Ruys), **A.M.**—Vigorous; forming dense clumps, with broad, dark green, arching foliage, 2 feet in height. Flower stems 3 feet tall, very widely branched from ⅓ of their length to the apex, 10- to 22-flowered. Flowers 5 inches diameter, flat funnel-shaped, soft pale apricot-orange, becoming darker with age, tips of petals reflexed and margins of inner petals wavy. Did not set seeds. Flowering very freely from June 12 to August 5.

SHIRLEY (B. Ladhams).—Very similar to the last but the flowers were smaller and paler; the flower stems not so branched.

QUEEN OF MAY (van Veen, Barr, den Ouden, Ruys, Perry, R.H.S.), **H.C.**—Habit similar to 'Shirley' but with paler foliage. Flower stems 3½ feet tall, widely branched from ⅓ of their length to the apex, 9- to 18-flowered. Flowers 4½ to 5 inches diameter, flat funnel-shaped, soft pale apricot-orange, deeper in the throat, reverse of the outer petals deeper, margins of the inner petals wavy. Seeding sparsely. Flowering freely from June 10 to July 15. *flava major* × *aurantiaca major*.

CORONA (G. Yeld).—Very similar to foregoing. Raised by sender. *flava* × *aurantiaca major*.

SEMPERFLORENS (Prichard), **A.M.**—Plant vigorous, forming dense clumps, with dark green foliage which droops at the tips, 2 feet in height. Flower stems 3 feet tall, very widely branched above the middle, 10- to 24-flowered. Flowers 4½ inches diameter, funnel-shaped, soft pale apricot-orange, tips of petals reflexed and the margins of the inner petals somewhat wavy. Seeds sparingly. Flowering very freely from June 12 to July 25.

B. LADHAMS (Ruys).—Much resembles 'Semperflorens' except that the flower stems are less branched, the flowers smaller, paler and less freely borne. Flowering from June 22 to July 12.

TAPLOW YELLOW (Barr).—Very similar to 'Semperflorens' in habit; the foliage is much paler and the flowers flatter, smaller, and less freely borne. Flowering from June 22 to July 16. Raised by sender.

APRICOT (Barr), **A.M.**—Vigorous; forming dense clumps, with medium green, arching foliage, 28 inches tall. Flower stems 34 inches tall, closely branched near the apex, 4- to 6-flowered. Flowers 3½ inches diameter, open funnel-shaped, soft apricot-orange. No fruits. Flowering very freely from May 30 to June 25. *flava* × *Middendorffii*.

APRICOT (Forbes, Ruys).—Very similar to the last except that the flowers are paler with wavy margins and less freely borne.

APRICOT (den Ouden).—Like the last but flowers smaller and longer, and the flower stems shorter.

APRICOT (Prichard).—Distinct from the other stocks of this variety. Flowers 2½ inches diameter, deeper shade of apricot-orange and partly hidden by the foliage.

SOVEREIGN (Barr, den Ouden, Ruys), **A.M.**—Plant vigorous, forming dense clumps, with medium green foliage, 2½ feet tall. Flowers stems erect, 3 feet tall, closely branching from well above the middle, 6- to 14-flowered; bracts not

conspicuous. Flowers 4 inches diameter, open funnel-shaped, opening pale apricot-chrome passing to creamy-yellow, reverse of petals reddish-brown; tips of petals reflexed; scented. No fruits. Flowering very freely from May 16 to June 26.

GOLD DUST (Ruys).—Plant similar to 'Sovereign.' Flowers darker, smaller and star-like in shape than the last. Flowering from May 25 to June 19.

GOLDEN BELL (Ruys), **H.C.**—Vigorous; forming close clumps, with dark green, arching foliage, 2 feet in height. Flower stems 2½ feet tall, branching above and below the middle very widely, 8- to 16-flowered. Flowers 4½ inches diameter, flat funnel-shaped, soft apricot-orange, throat darker; petals broad; recurved at the tips, inner somewhat wavy; scented. Seeds sparingly. Flowering from June 24 to August 5.

ORANGEMAN (den Ouden, Ruys).—Habit and foliage of 'Golden Bell.' Flower stems 3 feet in height, widely branched near the apex, 10-flowered. Flowers 4 inches diameter, funnel-shaped, yellow-chrome, reverse tinged reddish-brown. No fruits. Flowering from May 16 to June 24.

Flowers orange.

AWARDS.

Middendorffii, A.M. June 10, 1931. Sent by Messrs. Ruys, den Ouden, Forbes of Hawick. Also sent by Messrs. Prichard, Barr, as **Dr. Regel,** this shares the award.

Dumortieri, A.M. June 10, 1931. Sent by Messrs. den Ouden and the Royal Horticultural Society, Wisley.

Tangerine, A.M. June 10, 1931. Raised and sent by Mr. George Yeld, V.M.H., Gerrard's Cross.

Marigold, A.M. July 17, 1931. Raised and sent by Mr. G. Yeld, V.M.H.

Aurantiaca major, A.M. July 17, 1931. Sent by Messrs. Ruys.

Ajax, H.C. July 17, 1931. Sent by Messrs. Ruys.

NANA (R.H.S.).—Habit dwarf, forming close clumps, with narrow, dark green foliage, 16 inches tall. Flower stems 16 inches in height, outwards inclined, very closely branched near the apex, 1- to 3-flowered; bracts not conspicuous. Flowers 2½ inches diameter, star-shaped, orange-chrome, reverse reddish-brown; petals narrow; scented. Seeds medium size, very freely produced in oval capsules. Flowering from June 18 to July 1. Raised from Chinese seed collected by Mr. G. Forrest.

MIDDENDORFFII (Ruys, den Ouden, Forbes), **A.M.**—Plant vigorous, forming dense clumps with medium yellowish-green foliage, 24 inches tall, deciduous. Flower stems erect, 26 to 28 inches tall, just topping the foliage, 6 to 10 flowers in a capitate head with very conspicuous bracts. Flowers, 3½ inches diameter, almost cup-shaped, bright orange-yellow. Seeds of medium size, very freely produced in oval-shaped capsules Flowering very freely from May 30 to June 18. 'Dr. Regel' sent by Messrs. Prichard and Messrs. Barr is synonymous with this.

DUMORTIERI (den Ouden, R.H.S.), **A.M.**—Habit similar to 'Middendorffii' except that the flower stems are closely branched near the apex with inconspicuous bracts. Flowers 3½ inches diameter, flat funnel-shaped, soft apricot-orange, reverse tinged brown. Seeds sparingly in short oval capsules. Flowering freely from May 16 to June 26. Also known as *H. rutilans* or as *H. Sieboldii.*

DUMORTIERI (Barr, Ruys).—Distinct from the last. Flower stems less branched and erect with smaller star-like flowers which are deeper in colour. No fruits.

TAPLOW ORANGE (Barr).—Vigorous; forming close tufts of medium green foliage, which droops towards the tips, 2 feet tall. Flower stems 3½ feet tall, closely and sparsely branched near the summit; erect; 6- to 8-flowered. Flowers 4 inches diameter, almost cup-shaped, not opening widely in dull weather, bright orange-apricot. Seeds of medium size, sparingly produced in short oval capsules. Flowering from June 17 to July 13.

ORANGE VASE (Barr).—Habit of 'Taplow Orange' with darker foliage. Flower stems semi-erect, just topping the foliage, 3 feet tall, often twisted, 6- to 8-flowered. Flowers 3½ inches diameter, cup-shaped, bright rich orange-apricot. Seeds of medium size, sparingly produced in oval capsules. Flowering from June 16 to July 13.

ORANGE GLOW (Barr).—Habit similar to 'Taplow Orange' except that the flower stems are more widely branched with 9 to 16 flowers. Flowers 4 inches

diameter, short funnel-shaped, bright orange-apricot. Seeding freely in long oval capsules. Flowering from June 12 to July 15.

TANGERINE (Yeld), **A.M.**—Plant vigorous, forming dense tufts of medium green foliage, 20 inches in height. Flower stems 24 inches tall, erect, closely branched near the summit, 4- to 6-flowered. Flowers 3 inches diameter, wide funnel-shaped, bright orange-chrome, reverse of petals tinged pale brown. Medium-sized seeds freely borne in oval capsules. Flowering very freely from May 25 to June 20.

AJAX (Ruys), **H.C.**—Plant taller than 'Tangerine.' Flower stems 30 inches tall, sparsely yet closely branched at the summit, 6- to 10-flowered. Flowers 3½ inches diameter, deep rich orange-apricot, reverse tinged pale reddish-brown, tips of petals reflexed, margins wavy. No fruits. Flowering freely from June 22 to July 29.

MARIGOLD (Yeld), **A.M.**—Vigorous; forming dense clumps of dark green foliage, 28 inches tall. Flower stems 30 inches tall, branched near the top, 4- to 8-flowered. Flowers 3 inches diameter, short funnel-shaped, bright deep rich orange self; petals broad, overlapping. No fruits. Flowering very freely from June 16 to July 6.

AURANTIACA (Barr).—Foliage dwarfer and paler than 'Marigold' with taller flower stems, on which the flowers are clustered at the apex. Flowers 3½ inches diameter, bright rich orange, wide funnel-shaped. Medium seeds freely borne in oval capsules. Flowering from June 8 to July 10. Distinct from 'Aurantiaca' of other senders (see below).

AURANTIACA MAJOR (Ruys), **A.M.**—Very vigorous; forming dense clumps of broad, medium green foliage, 28 inches tall. Flower stems 3 feet tall, very closely branched near the top, erect, 10- to 24-flowered. Flowers 4½ inches diameter, wide funnel-shaped, bright rich orange self; petals of thick texture, ruffled, broad, overlapping. No fruits. Flowering freely from June 8 to July 25.

Flowers orange, middle tinged purple.

AWARDS.

Aureole, A.M. June 10, 1931. Sent by Messrs. Forbes, Ruys, Barr.
Sirius, A.M. July 17, 1931. Raised and sent by Mr. G. Yeld, V.M.H.

AUREOLE (Forbes, Ruys, Barr), **A.M.**—Vigorous; forming close clumps of medium green, deciduous foliage, 2 feet in height. Flower stems 28 inches tall, short-branched at the apex, erect, 5- or 6-flowered. Flowers 3½ inches diameter, wide funnel-shaped, bright yellow-chrome, middle of inner petals faintly speckled with purple, reverse tinged pale brown. Seeding sparingly in broad oval capsules. Flowering freely from May 25 to June 20.

SIRIUS (Yeld), **A.M.**—Vigorous; forming very dense tufts of medium green foliage, 2½ feet in height. Flower stems 3 feet tall, very closely branched near the apex, 8- to 10-flowered. Flowers 3½ inches diameter, wide funnel-shaped, bright orange, middle of each inner petal at the throat speckled reddish-purple, margins wavy, tips reflexed. No fruits. Flowering very freely from June 13 to August 5.

AURANTIACA (den Ouden, Ruys).—Not very vigorous; foliage medium green, broad, 28 inches in height. Flower stems 3 feet tall, closely-branched near the apex, 8- to 14-flowered. Flowers 4 inches diameter, somewhat starry, expanded, rich orange-chrome with a purple flush at middle of the inner petals. Few fruits. Flowering from June 17 to July 18. 'H. aurantiaca major,' sent by Messrs. den Ouden, and 'Sir M. Foster,' a misnomer, sent by Messrs. Kelway, were like this variety.

Later Varieties.

Flowers lemon.

AWARDS.

Lady Fermoy Hesketh, A.M. July 17, 1931. Raised and sent by Mr. A. Perry, Enfield, Middlesex.
Hyperion, A.M. August 14, 1931. Raised and sent by Mr. Franklin B. Mead, Fort Wayne, Indiana, U.S.A.
Thunbergii, H.C. July 17, 1931. Sent by Messrs. den Ouden, Wallace, Tunbridge Wells.
ochroleuca, H.C. July 17, 1931. Sent by Messrs. den Ouden, Ruys.

MUELLERI (Arends).—Very vigorous, forming close tufts of erect, dark green foliage, 3 feet in height. Flower stems 4 feet tall, much yet not widely branched near the top, 12- to 20-flowered. Flowers 4 inches diameter, starry, primrose, scented; petals narrow, pointed. Capsules round oval, few. Flowering very freely from July 4 to August 15.

CITRINA VAR. BARONI (Prichard).—Habit of 'Muelleri.' Foliage very dark green tinged grey, 26 inches in height, drooping. Flowers 5 inches diameter, sulphur, reverse tinged brown, scented; petals narrow, separated; buds tipped brown. Flower stems 3½ feet tall, branches short, very closely arranged at the top, 20- to 40-flowered. No fruits. Flowering very freely from July 10 to August 18. *Thunbergii* × *citrina*.

OCHROLEUCA (den Ouden, Ruys), **H.C.**—Very vigorous, forming dense clumps of dark dull green, 2½ feet tall. Flower stems erect, 3½ feet tall, branched towards the top, 15- to 30-flowered. Flowers 3½ inches diameter, somewhat starry, pale lemon, scented; petals narrow, separated; buds tinged brown at apex. Seeds freely borne in oval capsules. Flowering very freely from July 6 to August 25. *Thunbergii* × *citrina*.

LADY FERMOY HESKETH (Perry), **A.M.**—Habit of 'ochroleuca' except that the foliage is tinged with grey. Flowers 4 inches diameter, a shade darker than 'ochroleuca' with broader petals, the reverse darker. Seeds freely borne in short oval capsules. Flowering very freely from July 8 to August 22. *Thunbergii* × *citrina*.

HYPERION (Mead), **A.M.**—Plant very vigorous; foliage erect, 3 feet tall, medium to dark green. Flower stems 3½ feet tall, shortly and closely branched at the summit, 20- to 36-flowered. Flowers 5 inches diameter, wide funnel-shaped, pale sulphur, greenish in the throat, margins of petals wavy. No fruits. Flowering very freely from July 8 to August 28. *Sir Michael Foster* × *Florham*.

CHRYSOLORA (Perry).—Foliage 2½ feet tall, spreading, medium green. Flower stems widely branched near the summit, 10- to 20-flowered; bracts conspicuous. Flowers 4½ inches diameter, somewhat star-like, sulphur-apricot, deeper in the throat. Few seeds borne in oval capsules. Flowering from July 3 to August 5.

THUNBERGII (den Ouden, Wallace), **H.C.**—Vigorous, with narrow, medium to dark green foliage, 2½ feet tall. Flower stems 3½ feet tall, erect, much branched near the summit, 12- to 24-flowered. Flowers 3½ inches diameter, short funnel-shaped, sulphur-apricot, deeper in the throat; scented. Seeds sparsely borne in obovate capsules. Flowering very freely from July 3 to August 24.

Flowers apricot-yellow.

AWARDS.

Ophir, A.M. August 14, 1931. Raised and sent by The Farr Nursery Co., Weiser Park, Pa., U.S.A.

J. S. Gayner, A.M. August 14, 1931. Raised and sent by Mr. Geo. Yeld, V.M.H.

Radiant, A.M. August 14, 1931. Raised and sent by Mr. Geo. Yeld, V.M.H. [**A.M.** Yeld, 1925].

Gold Standard, H.C. August 14, 1931. Sent by Mr. Amos Perry, Enfield, Middlesex.

GOLD IMPERIAL (Perry).—Foliage medium green, 2½ feet tall. Flower stems 3 feet tall, erect, branched towards the top, 10- to 20-flowered. Flowers 4½ inches diameter, somewhat star-like, bright chrome-yellow, reverse darker; margins of petals wavy. Seeds freely in oval capsules. Flowering very freely from July 3 to August 15.

OPHIR (Farr), **A.M.**—Vigorous, forming close tufts of medium green foliage, 28 inches tall. Flower stems 3½ feet tall, erect, closely branched at the apex, 10- to 16-flowered. Flowers 4½ inches diameter, open funnel-shaped, bright chrome-yellow; petals broad, overlapping, margins wavy. Flowering very freely from July 10 to August 26.

MRS. PERRY (Perry).—Foliage 2 feet tall, medium green, drooping at the tips. Flower stems 3 to 3½ feet tall, very closely branched at the apex, 8- to 14-flowered; bracts conspicuous. Flowers 5½ inches diameter, wide funnel-shaped, apricot-orange, reverse darker, petals reflexed at tips, margins wavy. Seeds sparsely in wide oval capsules. Flowering from July 3 to August 2.

MANDARIN (Farr).—Vigorous, forming close tufts of dark green foliage, 2½ feet tall. Flower stems 4 feet tall, closely branched near the top, 10- to 18-flowered. Flowers 4½ inches diameter, star-like, soft cadmium-apricot;

petals narrow and separated, not opening fully in dull weather. Seeds borne in orbicular capsules. Flowering freely from July 6 to August 28.

GOLCONDA (Farr).—Very similar to 'Mandarin' but flowers of a darker shade.

SIR MICHAEL FOSTER (Prichard, Barr, Ruys, Perry).—Forming loose clumps of broad dark green foliage, 2 feet tall; slow of increase. Flower stems closely branched at the apex, 3 feet tall, 8- to 11-flowered; bracts conspicuous. Flowers 4½ to 5 inches diameter, somewhat starry, soft pale chrome-yellow, reverse darker, scented. Flowering sparsely from July 10 to August 22. *H. aurantiaca* × *H. citrina.*

GOLD STANDARD (Perry), **H.C.**—Vigorous, forming close tufts of dark green foliage, 28 inches in height. Flower stems 38 inches tall, erect, widely branched above the middle, side branches tinged purple, 15- to 30-flowered. Flowers 4 inches diameter, wide funnel-shaped, opening lemon and quickly passing to soft apricot-chrome, reverse tinged brown at the tips. Seeding freely. Flowering freely from July 13 to August 28.

LUTEOLA (Ruys, R.H.S.).—Forming dense clumps of dark green, drooping foliage, 2½ feet tall. Flower stems 3½ feet in height, branched above the middle, 10- to 14-flowered. Flowers 3½ inches diameter, wide funnel-shaped, soft cadmium-yellow, at first with a greenish tinge. Flowering from July 1 to August 5. *H. aurantiaca major* × *H. Thunbergii.*

LUTEOLA MAJOR (Ruys).—Very similar to 'luteola' except that the flower stems are dwarfer and more widely branched; foliage broader and flowers larger.

LUTEOLA GRANDIFLORA (R.H.S.)—Very similar to 'luteola major' except that the flowers are larger with wavy margins.

J. S. GAYNER (Yeld), **A.M.**—Very vigorous, forming dense tufts of medium green foliage, 3 feet in height. Flower stems 40 inches tall, erect, well branched at the apex, 8- to 14-flowered. Flowers 4½ inches diameter, wide, open funnel-shaped, soft orange-apricot, scented; petals broad, thick, tips reflexed, margins wavy. Seeding sparsely in ovate capsules. Flowering very freely from July 1 to August 20.

VESTA (Farr).—Vigorous; foliage medium green, dropping, 2 feet tall. Flower stems erect, 3 feet in height, branched near the top, 10- to 14-flowered. Flowers 4 inches diameter, short funnel-shaped, bright rich orange, middle of inner petals speckled faint purple, scented. Seeding sparsely in thick oval capsules. Flowering from July 17 to August 27.

RADIANT (Yeld), **A.M.**—Very vigorous, forming dense clumps of medium green foliage, 2½ feet tall. Flower stems 3½ feet tall, well branched above the middle, 15- to 25-flowered. Flowers 3½ to 4 inches diameter, short open funnel-shaped, bright rich glowing orange, petals broad, margins wavy. Flowering very freely from July 6 to August 25.

Flowers reddish-bronze.

AWARDS.

fulva cypriana, A.M. August 14, 1931. Sent by Messrs. R. Wallace, Tunbridge Wells and Mr. A. Perry, Enfield, Middlesex as **Margaret Perry,** this shares the award.

fulva flore pleno, A.M. August 14, 1931. Sent by Messrs. Barr, King St., Covent Garden, W.C., and by Messrs. H. den Ouden, Boskoop, Holland, as **H. disticha flore pleno.**

GEORGE YELD (Perry).—Foliage drooping, medium green, 2 feet tall. Flower stems 3 feet tall, closely branched at the top, 8- to 12-flowered. Flowers 4½ inches diameter, star-like, chrome-yellow suffused with red; petals separated, narrow. Flowering from July 12 to August 22. *H. Thunbergii* × *H. cypriana.*

FULVA (Forbes, Barr, den Ouden).—Vigorous, forming spreading clump of erect, dark green foliage, 3 feet tall; spreading by stolons. Flower stems erect, 4 feet tall, branched just above the middle, 10- to 14-flowered. Flowers 4 inches diameter, broad funnel-shaped, orange-brick with a central apricot-line on each petal; petals broad, tips reflexed, margins wavy. No fruits. Flowering from June 18 to August 12.

FULVA CYPRIANA (Wallace), **A.M.**—Vigorous, forming close clump of bright glossy green foliage, 2½ feet tall. Flower stems 4 feet tall, erect, closely branched near the top, 14- to 20-flowered. Flowers 4½ inches diameter, dull orange-brick, middle streaked apricot, reverse brownish. No fruits. Flowering freely from July 14 to September 22.

MARGARET PERRY (Perry), **A.M.**—Similar to 'fulva cypriana.' Also sent by the same sender as 'Maggie Perry.'

FULVA FLORE PLENO (Barr), **A.M.**—Vigorous; spreading by stolons; foliage pale yellowish-green, 28 inches tall, erect. Flower stems erect, 38 inches in height, closely branched at the top, 10- to 16-flowered. Flowers semi-double, 5 to 6 inches diameter, orange-brick, middle of inner petals blotched with deep red with longitudinal line of pale purple to the tips; many petaloid stamens. Flowering freely from July 15 to September 16.

DISTICHA FLORE PLENO (den Ouden), **A.M.**—Like 'fulva flore pleno.'

KWANSO FLORE PLENO (Forbes, den Ouden).—Very similar to 'fulva flore pleno' of Messrs. Barr except that the foliage is taller, 3 feet, and drooping; the flowers smaller, 4 inches diameter, of a redder and richer shade with fewer petaloid stamens; petals much reflexed at the tips. Flowering freely from July 24 to September 25. Also sent by Messrs. Ruys as *H. fulva flore pleno* and *H. fulva Kwanso flore pleno.*

KWANSO VARIEGATA (Forbes).—Similar to 'Kwanso flore pleno' except that the plant is less vigorous and the foliage is pale yellowish-green with longitudinal white bands. Also sent by Messrs. den Ouden as *H. Kwanso fol. variety.*

PENTSTEMONS TRIED AT WISLEY, 1930–31.

PLANTS of 103 stocks of named varieties of Pentstemons were sent to Wisley in 1930 for trial, and 47 packets of seeds (p. 119). Three plants of the varieties raised from cuttings were planted in clumps, 18 inches between the plants, and 24 plants of each stock of seedlings were put out on May 13, at about the same distance apart. All plants grew well and flowering began for all in the first week of August, with the exception of 3 species the judging of which had to be deferred until June 1931. The bulk were judged on August 22, 1930, and the results are shown below. The varieties are arranged according to colour in the report.

VARIETIES FROM CUTTINGS.

AWARDS, DESCRIPTIONS, AND NOTES.

Flowers white.

AWARDS.

White, A.M. August 22, 1930. Raised and sent by Messrs. Pfitzer, Stuttgart, Germany.

Newbury Gem White, A.M. August 22, 1930. Sent by Messrs. Barr, King Street, Covent Garden, W.C.

WHITE (Pfitzer), **A.M.**—3 feet; inflorescence 15 to 18 inches long; flowers 1¼ inch diameter, 1¼ inch long, creamy-white. Free flowering.

NEWBURY GEM WHITE (Barr), **A.M.**—2 feet; inflorescence 9 to 12 inches long; flowers 1¼ inch diameter, 1¼ inch long, opening cream tinged pink passing to creamy-white. It was sent under the erroneous name of 'Glamis White' by Messrs. Barr. This was also raised from seed.

Flowers white-edged rose.

AWARD.

Hon. Edith Gibbs, H.C. August 22, 1930. Raised and sent by the Hon. Vicary Gibbs, V.M.H., Aldenham House, Elstree.

FAIRY QUEEN (Barr).—2 feet; inflorescence 9 to 11 inches long; flowers 1¼ inch diameter, 1¼ inch long, white, margins tinged pale rose, throat white.

Hon. EDITH GIBBS (Gibbs), **H.C.**—3 feet; inflorescence 15 to 18 inches long; flowers 1¼ inch diameter, and long, white, margins tinged pale rose, throat and tube white. 'Rosalba' sent by Hon. V. Gibbs was identical to this.

DAYDREAM (Gibbs).—28 to 30 inches; inflorescence 12 to 15 inches long; flowers 1¼ inch diameter, 1¼ inch long, creamy-white, margins tinged rose; tube and throat creamy-white. Raised by sender.

LADY HUNSDON (Gibbs).—Characters of 'Daydream,' but flower a shade darker. Raised by sender.

Mrs. THOMAS TAYLOR (Forbes).—Characters of 'Daydream,' but flowers with much deeper tinge on the margins. Raised by sender, introduced 1927.

Flowers of rose shades.

AWARDS.

Dossie's Blush, A.M. August 22, 1930. Raised and sent by Hon. V. Gibbs, V.M.H. Also sent by Messrs. Barr.

James Gibson, A.M. August 22, 1930. Raised and sent by Messrs. John Forbes, Hawick.

Rosy Morn, A.M. August 22, 1930. Sent by Messrs. W. H. Simpson, Monument Road, Birmingham.

Pink Bedder, A.M. August 22, 1930. Raised by Mr. Hewell Grange and sent by Messrs. Forbes.

Gertrude Sanders, H.C. August 22, 1930. Sent by Messrs. Barr.

MARCHIONESS OF TULLIBARDINE (Forbes).—28 inches; inflorescence 9 to 12 inches long; flowers 1⅝ inch diameter, 1½ inch long, pale rose; throat white. Raised by sender, introduced 1910.

JED (Forbes).—28 inches; inflorescence 12 inches long; flowers 1¼ inch diameter, 1½ inch long, pale rose, throat white. Raised by sender, introduced 1929.

W. GOODMAN (Forbes).—Characters of 'Jed,' but flowers 1⅞ inch diameter, 1⅝ inch long, somewhat darker. Raised by sender.

DOSSIE'S BLUSH (Barr, Gibbs), **A.M.**—32 inches; inflorescence 16 inches long; flowers 1⅞ inch diameter, 1⅝ inch long, pale rose, throat white. Flowering very freely.

MRS. CALLANDER (Forbes).—2½ feet; inflorescence 15 inches long; flowers 1⅝ inch diameter, 1½ inch long, pale rose, throat white sparsely lined rose. Raised by sender.

MRS. A. P. LYLE (Forbes).—2 feet; inflorescence 12 to 15 inches long; flowers 1⅞ inch diameter, 1⅝ inch long, rose, throat white. Raised by sender.

JOHN RUTHVEN (Forbes).—Character of 'Mrs. A. P. Lyle,' but flowers somewhat smaller, and a shade darker. Raised by sender.

PRIMA DONNA (Gibbs).—32 inches; inflorescence 12 inches long; flowers 1¼ inch diameter, 1⅝ inch long, rose, throat white speckled rose. Raised by sender.

MADAME DE VILMORIN (Gibbs).—Characters of 'Prima Donna,' but foliage pale yellowish green. Raised by sender.

ROSE (Pfitzer).—Very similar to 'Prima Donna,' but flowers somewhat darker and freer flowering. Raised by sender.

COUNTESS GRANARD (Forbes).—26 inches; inflorescence 12 inches long; flowers 1½ inch diameter and long, bright rose, throat white lined rose-red. Raised by sender.

GARTH (Forbes).—28 inches; inflorescence 14 inches long; flowers 1⅝ inch diameter, 1½ inch long, bright rose, throat white heavily lined rose, mouth suffused rose-red. Raised by sender.

LADY SHERBORNE (Forbes).—30 inches; inflorescence 14 inches long; flowers 1⅞ inch diameter, 1½ inch deep, bright rose, throat white lined rose. Raised by sender, introduced 1923.

ARIEL (Forbes).—Very similar to 'Lady Sherborne,' but flowers somewhat smaller and with more colour at the mouth. Raised by sender, introduced 1928

TAPLOW ROSE (Barr).—Very much like 'Lady Sherborne.' Raised by sender.

GERTRUDE SANDERS (Barr), **H.C.**—32 inches; inflorescence 14 to 16 inches long; flowers 2 inches diameter, 1⅝ inch long, bright rose, throat white.

JAMES GIBSON (Forbes), **A.M.**—32 inches; inflorescence 14 inches long; flowers 1⅝ inch diameter, 1⅝ inch long, bright rose, throat white. Very free flowering.

MRS. N. F. BARNES (Forbes).—32 inches; inflorescence 15 inches long; flowers 1⅝ inch diameter and long, bright rose, throat white. Raised by sender.

ROSY MORN (W. H. Simpson), **A.M.**—28 inches; inflorescence 10 to 12 inches long; flowers 1⅝ inch diameter, 1½ inch long, bright rich deep rose; throat lined with deep rose. Very free flowering.

PINK BEDDER (Forbes), **A.M.**—30 inches; inflorescence 9 inches long, loosely arranged; flowers 1⅝ inch diameter, 1½ inch long, old rose; throat white lined old rose. Very free flowering.

Flowers of rose-red shades.

AWARDS.

James F. McLeod, H.C. August 22, 1930. Raised and sent by Messrs. Forbes.

Duchess of Albany, H.C. August 22, 1930. Raised and sent by Messrs. Forbes.

Earl Haig, H.C. August 22, 1930. Raised and sent by Messrs. Forbes.

Lord Charles Hope, H.C. August 22, 1930. Sent by Messrs. Barr.

HON. ALAN GIBBS (Barr).—26 inches; inflorescence 12 inches long; flowers 1¾ inch diameter, 1¾ inch long, bright rose-red, throat white.

MRS. MUNN (Forbes).—28 inches; inflorescence 15 inches long; flowers 1¾ inch diameter, 1¾ inch long, bright rose-red, tube paler, throat white lined rose-red. Raised by sender.

CHESTER SCARLET (Barr).—28 inches; inflorescence 12 inches long; flowers 2 inches diameter, 1¾ inch long, bright rose-red, throat white heavily lined rose-red.

HARRY BRETT (W. H. Simpson).—28 inches; inflorescence 12 to 14 inches long; flowers 1¾ inch diameter and long, darker than 'Chester Scarlet,' with less markings in the throat.

JAMES F. MCLEOD (Forbes), **H.C.**—28 inches; inflorescence 12 to 16 inches long; flowers 1¾ inch diameter, 1¾ inch long, bright rosy-red, throat white. Free flowering.

BARBARA HOPE (Barr).—32 inches; inflorescence 15 to 18 inches long; flowers 1¾ inch wide and long, bright rose-red, throat white speckled and lined red.

DUCHESS OF ALBANY (Forbes), **H.C.**—32 inches; inflorescence 12 to 16 inches long; flowers 1¾ inch diameter, 1¾ inch long, bright rose-red, throat white lined rose-red, mouth suffused rosy-crimson; free flowering.

AGNES (Barr).—Very similar to 'Duchess of Albany,' but shorter inflorescence and flowers duller with white throats.

SLITRIG (Forbes).—Characters of 'Agnes,' but dwarfer and flower with paler tube. Raised by sender, introduced 1930.

EARL HAIG (Forbes), **H.C.**—28 inches; inflorescence 12 inches long; flowers 1¾ inch diameter, 1¾ inch long, rosy-red, throat white lined rosy-red.

BONNIE LASS (Barr).—Characters of 'Earl Haig,' but flowers smaller and of a paler and brighter shade.

LORD CHARLES HOPE (Barr), **H.C.**—28 inches; inflorescence 12 to 15 inches long; flowers 1¾ inch diameter and long, rich rosy-red, throat white faintly lined red.

NEWBURY GEM CERISE (Barr).—24 inches; inflorescence 9 inches long, loosely arranged; flowers 1 inch diameter, 1¾ inch long, deep rose-red, throat white lined deep rose-red.

DISTINCTION (Barr).—Taller with longer spikes and larger flowers which are deeper coloured in the throat than 'Newbury Gem Cerise.'

JOHN JENNINGS (Forbes).—2 feet; inflorescence 12 inches long; flowers 1¾ inch diameter, 1¾ inch long, rosy-carmine, throat white.

AUTUMN CHEER (Barr).—Very similar to 'John Jennings,' but flowers smaller and throat white streaked carmine.

LADY NORTHCLIFFE (Forbes).—Very similar to 'Autumn Cheer,' but with longer spikes and more colour in the throat of the flowers. Raised by sender, introduced 1922.

Flowers of red shades.

AWARDS.

George Home, A.M. August 22, 1930. Raised and sent by Messrs. Forbes Also sent by Messrs. W. H. Simpson; and by Messrs. Barr as 'George Holmes.'

Lady Greenall, A.M. August 22, 1930. Raised and sent by Messrs. Forbes and introduced by them in 1921.

Castle Forbes, A.M. August 22, 1930. Raised and sent by Messrs. Forbes and introduced by them in 1912; also sent by Messrs. W. H. Simpson.

Alexandra Mitchell, H.C. August 22, 1930. Sent by Messrs. Barr.

KING GEORGE V. (Forbes).—26 inches; inflorescence 12 inches long; flowers 2 inches diameter, 1¾ inch long, bright rosy spectrum-red, throat lined and speckled red. Raised by sender, introduced 1911.

MIKADO (Barr).—2 feet; inflorescence 9 to 12 inches long; flowers 1¼ inch diameter and long, dull spinel-red, throat white lined red.

SOUTHGATE GEM (Barr).—2½ feet; inflorescence 10 to 15 inches long; flowers 1¼ inch diameter, 1¾ inch long, bright pillar-box red, throat white lined red. Also raised from seed.

LORD ALDENHAM (Gibbs).—2½ feet; inflorescence 12 inches long; flowers 2 inches diameter, 1¾ inch long, a deeper shade than 'Southgate Gem.'

GEORGE HOME (Forbes, W. H. Simpson), **A.M.**—28 inches; inflorescence 12 to 15 inches long; flowers 1¾ inch diameter and long, bright pillar-box red, throat white faintly lined red. Very free flowering.

GEORGE HOLMES (Barr), **A.M.**—Like 'George Home.'

ALEXANDRA MITCHELL (Barr), **H.C.**—30 inches; inflorescence 14 inches long; flowers 2 inches diameter, 1¼ inch long, pillar-box red, throat white faintly speckled red at the mouth.

FEUERMEER (Pfitzer).—3 feet; inflorescence 16 to 18 inches long; flowers 2 inches diameter, 1¼ inch long, rich pillar-box red, throat white lined red. Free flowering. Raised by sender.

CAPTAIN (Gibbs).—Very similar to 'Feuermeer,' but somewhat dwarfer. Raised by sender.

FIERY RED (Pfitzer).—Characters of 'Feuermeer,' but dwarfer, 2 feet, and flowers paler. Raised by sender.

LADY GREENALL (Forbes), **A.M.**—28 inches; inflorescence 16 to 18 inches long; flowers 1¼ inch long and wide, pillar-box red, throat white speckled red.

CASTLE FORBES (Forbes, W. H. Simpson), **A.M.**—2½ feet; inflorescence 12 to 14 inches long; flowers 1½ inch diameter, 1¼ inch long, rich pillar-box red, throat white; free flowering.

NEWBURY GEM SCARLET (Barr).—20 inches; inflorescence 6 to 9 inches long, loosely arranged; flowers ¾ inch diameter, 1¼ inch long, deep rich pillar-box red, throat white lined red.

Flowers of dark red shades.

AWARDS.

Victory, A.M. August 22, 1930. Raised and sent by Messrs. Forbes.

Masterpiece, A.M. August 22, 1930. Raised and sent by the Hon. V. Gibbs, V.M.H.

Maurice Gibbs, A.M. August 22, 1930. Raised and sent by the Hon. V. Gibbs, V.M.H.

Lord Hunsdon, H.C. August 22, 1930. Raised and sent by the Hon. V. Gibbs, V.M.H.

VICTORY (Forbes), **A.M.**—32 inches; inflorescence 15 inches long; flowers 1¾ inch diameter and long, deep red, throat white, streaked rose; very free flowering.

MASTERPIECE (Gibbs), **A.M.**—Habit of 'Victory,' but flowers of a richer and brighter shade with white throats.

MRS. C. G. MOIR (Forbes).—30 inches; inflorescence 13 inches long; flowers 1¾ inch diameter, 1½ inch long, deep red, throat white, streaked red. Raised by sender.

MAURICE GIBBS (Gibbs), **A.M.**—30 inches; inflorescence 15 to 17 inches long; flowers 1¾ inch diameter and long, bright dark red; free flowering.

ALEXANDER BROWN (Forbes).—30 inches; inflorescence 12 to 14 inches long; flowers 1¾ inch diameter and long, dull crimson-red, throat white. Raised by sender.

MRS. FORBES (Forbes).—2 feet; inflorescence 12 inches long; flowers 1¾ inch diameter, 1½ inch long, bright crimson, tinged purple, throat white lined and speckled with crimson. Raised by sender.

CRIMSON (Pfitzer).—28 inches; inflorescence 15 inches long; flowers 1½ inch diameter and long, dull crimson tinged purple, throat white, lined crimson, and suffused at the mouth. Raised by sender.

MRS. TEMPEST (Forbes).—26 inches; inflorescence 12 to 14 inches long; flowers 1¾ inch diameter and long, rich crimson tinged purple, throat lined crimson, mouth crimson-purple. Raised by sender.

LORD HUNSDON (Gibbs), **H.C.**—28 inches; inflorescence 15 inches long; flowers 1¼ inch diameter, 2 inches long, crimson tinged purple, throat white.

MRS. SHAKESPEARE (Forbes).—2 feet; inflorescence 12 to 15 inches long; flowers smaller and darker than 'Lord Hunsdon.'

FLAMBEAU (Forbes).—26 inches; inflorescence 12 inches long; flowers 1¾ inch diameter, 1½ inch long, rosy-crimson, throat white, lined crimson, mouth reddish-maroon. Raised by sender, introduced 1927.

Flowers mauve.

HAZELDELL GEM (Bradbury).—3 feet; inflorescence 15 to 18 inches long, loosely arranged; flowers 1½ inch diameter, 1¼ inch long, mauve, white throat. Raised by sender.

GENTIANOIDES (W. H. Simpson).—Characters of 'Hazeldell Gem,' but flowers of a darker shade.

AMARANTH (Pfitzer).—28 inches; inflorescence 12 inches long; flowers 1½ inch diameter, 1½ inch long, lavender-mauve, throat white lined lavender-mauve. Raised by sender.

Flowers of lilac shades.

AWARD.

Mrs. Edward Mathews, A.M. August 22, 1930. Raised by the Parks Department, Glasgow, introduced in 1925, and sent by Messrs. Forbes.

MRS. EDWARD MATHEWS (Forbes), **A.M.**—26 inches; inflorescence 16 inches long; flowers 1¾ inch diameter, 1½ inch long, rosy-lavender, throat white.

STAPLEFORD GEM (Forbes).—2 feet; inflorescence 8 to 11 inches long; flowers ¾ inch diameter, 1¼ inch long, rich lilac, throat white, lined lilac. Raised by Mr. Graham. Free flowering.

TWEED (Forbes).—2 feet; inflorescence 12 inches long; flowers 1¾ inch diameter, 1½ inch long, rosy-lilac, throat white. Raised by sender, introduced 1930.

LIGHT LILAC (Pfitzer).—28 inches; inflorescence 12 to 14 inches long; flowers 1½ inch diameter, 1½ inch long, rich rosy-lilac, throat white. Raised by sender.

LILAC QUEEN (Gibbs).—Characters of 'Light Lilac,' but flowers larger. Raised by sender.

JAMES JEFFREY (Forbes).—26 inches; inflorescence 12 inches long; flowers 1½ inch diameter and long, deep lilac, throat white lined lilac, mouth purplish-maroon. Raised by sender.

BORTHWICK (Forbes).—15 inches; inflorescence 9 to 12 inches long; flowers larger with paler throat and mouth than 'James Jeffrey.' Raised by sender, introduced 1929.

MRS. WROHAM (Forbes).—2½ feet; inflorescence 12 inches long; flowers 1¾ inch diameter, 1½ inch long, deep lilac, throat white. Raised by sender, introduced 1925.

MRS. D. M. MCKINNON (Forbes).—1½ feet; inflorescence 8 to 10 inches long; flowers 2 inches diameter, 1½ inch long, bright deep lilac, throat white lined and speckled purple. Raised by sender.

JOHN FORBES (Forbes).—2 feet; inflorescence 9 to 12 inches long; flowers 1¾ inch diameter, 1½ inch long, rich deep lilac, throat white lined red, mouth reddish. Raised by sender.

Flowers of magenta shades.

JOHN JACKSON (Forbes).—2 feet; inflorescence 9 to 12 inches long; flowers 1½ inch diameter, 1½ inch long, rosy-magenta, throat white lined and speckled magenta. Raised by sender.

LAMBERT MIDDLETON (Forbes).—2½ feet; inflorescence 14 inches long; flowers somewhat darker than 'John Jackson,' throat white streaked brownish-rose. Raised by sender, introduced 1923.

KIA-ORA (Forbes).—2½ feet; inflorescence 12 inches long; flowers 1½ inch diameter, 1½ inch long, bright magenta, throat white, faintly speckled magenta at the mouth. Raised by sender, introduced 1927.

UNIQUE (Gibbs).—Very similar to 'Kia-Ora,' but flowers of a duller shade, and lobes of the corolla rounded. Raised by sender.

MISS STEWART PETER (Forbes).—Characters of 'Kia-Ora,' but corolla flattened with pointed lobes; throat faintly lined magenta. Raised by sender.

DUCHESS OF WESTMINSTER (Forbes).—2 feet; inflorescence 12 inches long; flowers 1¾ inch diameter, 1½ inch long, purplish-magenta. Raised by sender.

LADY HAMILTON (Forbes).—28 inches; inflorescence 12 to 15 inches long, flowers 1¾ inch diameter, 1½ inch long, purplish-magenta, throat white lined magenta, mouth magenta. Raised by sender, introduced 1913.

GABRIEL VOISIN (Forbes).—2 feet; inflorescence 9 to 12 inches; flowers 1½ inch diameter, 1½ inch long, dull purplish-magenta, throat white lined magenta. Raised by M. Lemoine.

Flowers of purple shades.

KELLERMANI (Forbes, Barr).—2 feet; inflorescence 9 to 12 inches long; flowers ¾ inch diameter, 1½ inch long, dull violet-purple, throat white, lined violet-maroon.

COUNTESS OF DALKEITH (Forbes).—2½ feet; inflorescence 12 to 15 inches long; flowers 1½ inch diameter, 1½ inch long, dull purple, throat white faintly speckled purple. Raised by sender.

MRS. JOHN FORBES (Forbes).—2 feet; inflorescence 12 inches long; flowers 1¼ inch diameter; 1¼ inch long, auricula-purple, throat white lined purple, mouth purplish-maroon. Raised by sender, introduced 1927.

NEGRESS (Barr).—28 inches; inflorescence 9 to 12 inches long; flowers 1¼ inch diameter, 1¼ inch long, dark purplish-maroon, throat white heavily lined purple-maroon, mouth red-maroon.

VARIETIES RAISED FROM SEED.

AWARDS, DESCRIPTIONS, AND NOTES.

Flowers white.

AWARD.

White Bedder, H.C. August 22, 1930. Sent by Messrs. Hurst, Houndsditch, London, E., and Messrs. Barr, King Street, Covent Garden, W.C.

WHITE NEWBURY GEM (Barr).—2 feet; inflorescence 15 inches long; flowers 1¼ inch diameter, 1¼ inch long, creamy-white. Pink rogues.

WHITE BEDDER (Hurst, Barr), **H.C.**—2 feet; inflorescence 18 inches long; flowers 1¼ inch diameter, 1¼ inch long, creamy-white, very faintly tinged pink on lower lip.

GIANT WHITE (Pfitzer).—2 feet; inflorescence 16 inches long; flowers 1¼ inch diameter, 1¼ inch long, creamy-white, margins of lower lip tinged pale pink. A mixed stock.

Flowers white, edged rose.

AWARDS.

White, Rose Edged, H.C. August 22, 1930. Raised and sent by Messrs. Sutton, Reading.

Carmine Queen, H.C. August 22, 1930. Introduced and sent by Carter's Tested Seeds, Raynes Park, S.W.

WHITE, ROSE EDGED (Sutton), **H.C.**—2 feet; inflorescence 15 inches long; flowers 1¼ inch diameter, 1¼ inch long, white, margined bright rose.

CARMINE QUEEN (Carter's Tested Seeds), **H.C.**—26 inches; inflorescence 15 inches long; flowers 1¼ inch diameter, 1¼ inch long, white edged rose; throat white.

CARMINE QUEEN (Barr).—Like the last, but very variable in colour.

Flowers of rose shades.

MIDDLETON GEM SEEDLING (Sutton.)—28 inches; inflorescence loosely arranged, 9 inches long; flowers 1¼ inch diameter, 1¼ inch long, pale rose. Variable in shade.

MIDDLETON GEM (Hurst, Barr).—Very similar to 'Middleton Gem Seedling,' but flowers darker. Stocks very variable in shade.

GIANT ROSE (Pfitzer).—A mixed stock.

GIANT CARMINE (Pfitzer).—A mixed stock.

Flowers of red shades.

AWARDS.

Large Flowered Scarlet, A.M. August 22, 1930. Raised and sent by Messrs. Sutton.

Southcote Gem, H.C. August 22, 1930. Sent by Carter's Tested Seeds.

barbatus coccineus, H.C. August 22, 1930. Sent by Messrs. Barr.

LARGE FLOWERED SCARLET (Sutton), **A.M.**—2¼ feet; inflorescence 15 inches long; flowers 1¼ inch diameter, 1¼ inch long, bright rosy-red. A true even stock.

NEWBURY GEM (Hurst, Barr).—Very similar to 'Large Flowered Scarlet,' but flowers of a deeper shade. Stocks variable in shade and containing pink rogues.

GIANT RED (Pfitzer).—Stock very variable in shade. Contained 5 per cent. violet rogues.

GIANT HYBRIDS IMPROVED (Heinemann).—2¼ feet; inflorescence 18 inches long; flowers 1¼ inch diameter and long, rosy-red, white throat. 3 per cent. pink rogues.

SOUTHGATE GEM (Hurst, Barr).—2½ feet; inflorescence 15 inches long; flowers 1½ inch diameter, 1½ inch long, bright pillar-box red, throat white, lined with red. Stocks not true.

SOUTHCOTE GEM (Carter's Tested Seeds), **H.C.**—A true and even stock of 'Southgate Gem.'

BARBATUS COCCINEUS (Barr), **H.C.**—4 to 5 feet; inflorescence 12 to 24 inches long, branched; flowers ¾ inch diameter, 1¼ inch long, scarlet.

Flowers of blue shades.

AWARD.

confertus var. coeruleo-purpureus, A.M. June 10, 1931. Sent by Messrs. Barr as P. *procerus*.

SUB-GLABER (Sutton).—2½ feet; inflorescence 9 to 14 inches long; peduncles 9 to 16 flowered; flowers ¾ inch diameter, 1¼ long, bright azure-blue tinged rose, throat rosy-lilac lined rosy-purple. Flowering from May 28, 1931.

CONFERTUS VAR. COERULEO-PURPUREUS (Barr), **A.M.**—3½ feet, inflorescence 9 to 15 inches long; peduncles 9 to 16 flowered; flowers ¾ inch diameter, ¾ inch long, bright azure-blue; flowering very freely from May 25, 1931. Sent as *P. procerus*.

CYANANTHUS (Watkins & Simpson).—Very similar to the last, but not so free flowering and flowers azure-blue, tinged rose. Variable in shade.

Flowers of purple shades.

GIANT LILAC (Pfitzer).—2½ feet; inflorescence 12 to 14 inches long; flowers 1½ inch long and wide, pale magenta, throat white. A mixed stock.

GIANT AMARANTH (Pfitzer).—Habit of 'Giant Lilac,' but flowers violet-purple, throat white lined violet-maroon. 30 per cent. red rogues.

Flowers various.

AWARDS.

Exhibition Strain, A.M. August 22, 1930. Raised and sent by Messrs. Gemmell, Glasgow.

Hybrids, A.M. August 22, 1930. Raised and sent by Messrs. Forbes, Hawick.

New Giant Flowered Mixed, A.M. August 22, 1930. Raised and sent by Messrs. Sluis & Groot, Enkhuizen, Holland.

Crown Jewels, H.C. August 22, 1930. Sent by Messrs. Webb, Stourbridge.

Superb Mixed, H.C. August 22, 1930. Sent by Messrs. Dawkins, King's Road, Chelsea, S.W.

Excelsior Strain, H.C. August 22, 1930. Sent by Messrs. Watkins & Simpson, Drury Lane, Covent Garden, W.C.

Giant Floradale Hybrids H.C. August 22, 1930. Raised and sent by Messrs. Atlee Burpee, Philadelphia, U.S.A.

EXHIBITION STRAIN (Gemmell), **A.M.**—2½ feet; inflorescence 12 to 15 inches long; flowers 2½ inches diameter, 2 inches long. A very good strain of large flowers.

HYBRIDS (Forbes), **A.M.**—Flowers 1½ to 1¾ inch diameter, 1½ to 1¾ inch long.

GIANT FLOWERED MIXED (Sluis & Groot), **A.M.**—Very similar strain to 'Hybrids.'

CROWN JEWELS (Webb), **H.C.**

SUPERB MIXED (Dawkins), **H.C.**

EXCELSIOR STRAIN (Watkins & Simpson), **H.C.**

GIANT FLORADALE HYBRIDS (Burpee), **H.C.**

IMPERIAL HYBRIDS (Carter's Tested Seeds).

LARGE FLOWERED MIXED (Carter's Tested Seeds).

SENSATION (Waller-Franklin).

SELECTED (Dobbie).

GIANT HYBRIDS IMPROVED (Heinemann).

GRANDIFLORA (Haage & Schmidt).

GIANT MIXED (Pfitzer).

MONARCH (Hurst).

LARGE FLOWERED MIXED (W. H. Simpson).

NEW LARGE FLOWERED MIXED (Barr).

NEW ISOPHYLLUS HYBRIDS (Kelway).—Mostly of bluish shades.

ISOPHYLLUS HYBRIDS (Barr).—Mostly of bluish shades.

ANNUAL SCABIOUS AT WISLEY, 1931.

THE last trial of Annual Scabious at Wisley took place in 1926, and is reported in our JOURNAL, **51**, p. 113. In the present trial 92 stocks were grown, the seed being sown, two or three in a "60" pot, on April 21, and singled without further disturbance The plants were put out on June 11, in rows 18 inches apart, 12 inches apart in the rows. Flowering commenced at the end of August and judging took place on October 2. The awards recommended are shown in the following notes.

AWARDS, DESCRIPTIONS AND NOTES.

Habit Dwarf (up to 18 inches).

AWARDS.

Coral Gem, H.C. October 2, 1931. Sent by Messrs. Watkins & Simpson, Drury Lane, Covent Garden, W.C.

Tom Thumb Mixed, H.C. October 2, 1931. Sent by Messrs. Barr, King Street, Covent Garden, W.C. 2.

Pink.

CORAL GEM (Watkins & Simpson), **H.C.**—15 inches tall, compact; stems 12 inches long; flowers 1¼ inch diameter, dull coral-pink.

Red.

FIERY SCARLET (Watkins & Simpson).—18 inches tall, compact; stems 12 inches long; flowers 1¼ inch diameter, scarlet. Very variable in shade.

Mixed.

TOM THUMB MIXED (Barr), **H.C.**—10 inches tall, compact; stems 9 inches long; flowers 1¼ inch diameter.

Habit Intermediate (over 18 inches and less than 36 inches).

Yellow.

YELLOW PRINCE (Barr).—2 feet tall, somewhat spreading; stems 9 inches long; flowers 1¾ inch diameter, almost round, deep cream. A true even stock.

YELLOW (Dobbie).—Very similar to 'Yellow Prince,' but taller; 32 inches tall. Paler cream and pink rogues.

Habit Tall (over 3 feet).

White.

AWARDS.

Shasta, A.M. October 2, 1931. Raised and sent by Messrs. Waller-Franklin, Guadalupe, California, U.S.A. Also sent by Messrs. Clucas, Ormskirk.

Snowball selected, H.C. Sent by Messrs. Barr. [**A.M.** 1924.]

SNOWBALL SELECTED (Barr), **H.C.**—3 feet tall, somewhat spreading; stems 12 to 20 inches long; flowers 2 inches diameter, almost round, white with a cream tint. A good even stock.

SNOWBALL (Nutting).—Similar to the last, but flowers somewhat larger. Stock not true.

SHASTA (Waller-Franklin, Clucas), **A.M.**—3 feet tall, somewhat spreading; stems 12 to 18 inches long; flowers 2½ inches diameter, flat-round, white. True, even stocks. Stocks from Messrs. Dobbie, Barr, Pfitzer, Watkins & Simpson, Kelway, and Johnson contained rogues.

WHITE (Dobbie, Carter, Benary).—Very similar to 'Shasta,' but flowers smaller, 2 to 2½ inches diameter. Stocks contained colour rogues.

THE BRIDE (Daniels).—A very variable stock both in colour and habit,

Pink shades.

AWARDS.

Loveliness, A.M. October 2, 1931. Raised by Messrs. Waller-Franklin and sent by Messrs. Clucas. Also sent by Messrs. Dobbie, Edinburgh, whose stock was **Highly Commended.**

Coral Gem, A.M. October 2, 1931. Sent by Messrs. Watkins & Simpson.

Peach Blossom, H.C. October 2, 1931. Raised by Messrs. Waller-Franklin and sent by Messrs. Dobbie and Messrs. Pfitzer, Stuttgart, Germany.

PEACH BLOSSOM (Dobbie, Pfitzer), **H.C.**—3 feet tall; stems 12 to 24 inches long; flowers 2½ to 2¾ inches diameter, flat-round, delicate pale rose-pink. True and even stocks. Other stocks from Messrs. Waller-Franklin, Watkins & Simpson, Johnson, Barr, Clucas, and Kelway were variable in shade.

LOVELINESS (Clucas), **A.M.**—3 feet tall; stems 12 to 18 inches long; flowers 2 to 2½ inches diameter, flat-round, soft salmon-pink. A very good even stock.

LOVELINESS (Dobbie), **H.C.**—Like the last, but less regular.

LOVELINESS (Waller-Franklin, Dawkins, Johnson, Morris, Pfitzer).—Like the last, but stocks variable in shade and contained apricot rogues.

SHELL PINK (Daniels).—3 feet tall, somewhat spreading; stems 9 to 15 inches long; flowers 2 to 2½ inches diameter, flat-round, pale rose-pink. Variable in shade, with colour rogues.

FLESH (Hurst).—Very much like 'Shell Pink.' Stock variable in shade and with colour rogues.

FLESH PINK (Macdonald Seed Co.).—3 feet tall; stems 12 to 18 inches long; flowers 2½ inches diameter, flat-round, pale rose-pink. Variable in shade, white rogues.

CORAL GEM (Watkins & Simpson), **A.M.**—38 inches tall, somewhat spreading; stems 12 to 18 inches long; flowers 2½ inches diameter, flat-round, bright coral-pink. A good even stock.

Rose shades.

CORAL PINK (Barr).—3 feet tall, somewhat spreading; stems 12 to 18 inches; flowers 2½ inches diameter, flat-round, pale rose. Very variable in shade, lilac and maroon rogues.

ROSE (Macdonald Seed Co.).—Very similar to 'Coral Pink,' but flowers of a deeper shade. Very variable in shade, maroon rogues.

ROSE (Hurst, Benary).—Stocks very variable in shade.

ROSEA (Daniels).—A variable stock and later to flower than most.

DEEP ROSE PINK (W. H. Simpson).—A mixed stock.

Lilac.

AWARD.

Lilac, H.C. October 2, 1931. Sent by Messrs. Dobbie.

LILAC (Dobbie), **H.C.**—3 feet tall, somewhat spreading; stems 12 to 18 inches long; flowers 2½ inches diameter, flat-round, lilac. A good even stock.

LILAC (Benary).—Like the last, but contained maroon rogues.

Lavender and Mauve.

AWARDS.

Blue Cockade, A.M. October 2, 1931. Raised and sent by Messrs. Hurst, Houndsditch, London, E. 3.

Azure Fairy, H.C. October 2, 1931. Raised and sent by Messrs. Waller-Franklin; also sent by Messrs. Watkins & Simpson and by Messrs. Barr as **'Fairy'**: this shares the award.

Ageratum Blue, H.C. October 2, 1931. Raised and sent by Messrs. Waller-Franklin.

Azure Blue, H.C. October 2, 1931. Sent by Messrs. Hurst.

AZURE FAIRY (Watkins & Simpson, Waller-Franklin), **H.C.**—3 feet tall, somewhat spreading; stems 12 to 24 inches long; flowers 2½ inches diameter, lavender. Very true and even stocks.

AZURE FAIRY (Macdonald Seed Co., Morris, W. H. Simpson, Dawkins, Dobbie, Nutting).—Less regular stocks of the last. Stocks contained dark budded rogues.

FAIRY (Barr), **H.C.**—Characters of 'Azure Fairy.'

FAIRY (Heinemann).—Like 'Azure Fairy,' but a mixed stock.

MAUVE QUEEN (Daniels).—Characters of 'Azure Fairy,' but flowers of a darker shade.

AGERATUM BLUE (Waller-Franklin), **H.C.**—Characters of 'Azure Fairy,' but flowers of a much darker and richer shade.

AZURE BLUE (Hurst), **H.C.**—Characters of 'Azure Fairy,' but flowers bright azure-blue. A true and even stock.

BLUE COCKADE (Hurst), **A.M.**—Very similar in habit to 'Azure Fairy,' except that the flowers are deep rich azure-blue. A very true and even stock.

Carmine shades.

AWARDS.

Cherry Red, A.M. October 2, 1931. Sent by Messrs. Hurst.

Fire King, A.M. October 2, 1931. Sent by Mr. A. Dawkins, Kings Road, Chelsea, and by Messrs. Watkins & Simpson (**H.C.**).

Bright Crimson, A.M. October 2, 1931. Sent by Messrs. W. H. Simpson.

Brick Red, H.C. October 2, 1931. Sent by Messrs. Benary, Erfurt, Germany.

CARMINE (Dobbie).—3 feet tall; stems 12 to 18 inches long; flowers 2½ inches diameter, rich carmine. Variable in shade.

BRICK RED (Benary), **H.C.**—Like 'Carmine,' but a true stock.

FIRE KING (Waller-Franklin, Nutting).—Characters of 'Carmine,' but flowers of a darker shade. Stocks variable in shade.

CHERRY RED (Hurst), **A.M.**—3 feet tall, somewhat spreading; stems 12 to 18 inches long; flowers 2½ inches diameter, flat-round. A very good even stock.

CHERRY RED (Nutting, Carter, Dobbie, Dawkins, Benary).—Less regular stocks of the last.

CORAL RED (Barr).—An untrue stock of 'Cherry Red.'

FIRE KING (Dawkins), **A.M.**—Characters of 'Cherry Red,' but flowers purplish-carmine. A true even stock.

FIRE KING (Watkins & Simpson), **H.C.**—A less regular stock of the last.

FIRE KING (Barr.)—A mixed stock.

BRIGHT CRIMSON (W. H. Simpson), **A.M.**—A very true and even stock of 'Fire King.'

Purplish edged white.

AWARD.

Black Purple and White, H.C. October 2, 1931. Sent by Messrs. Benary.

CHERRY RED AND WHITE (W. H. Simpson).—3 feet tall; stems 12 to 18 inches long; flowers 2½ inches diameter, flat-round, pale purple edged white. Variable in shade.

CRIMSON AND WHITE (Dobbie).—Characters of 'Cherry Red and White,' but flowers smaller, rosy-crimson edged white. Variable in shade.

VELVETY CRIMSON AND WHITE (W. H. Simpson).—A mixed stock.

BLACK PURPLE AND WHITE (Benary), **H.C.**—3 feet tall, somewhat spreading; stems 12 to 18 inches long; flowers 2 to 2½ inches diameter, purplish-maroon edged blush-white.

POMPADOUR (Dobbie).—Like 'Black Purple and White.' Contained carmine rogues.

PURPLE AND WHITE (Daniels).—Like 'Black Purple and White.'

MAROON AND WHITE (Hurst, Dobbie).—Like 'Black Purple and White.' Contained blush and self-coloured rogues.

AWARD.

King of the Blacks, A.M. October 2, 1931. Sent by the Macdonald Seed Co., Santa Maria, California, U.S.A.

Crimson-maroon.

KING OF THE BLACKS (Macdonald Seed Co.), **A.M.**—3 feet tall; stems 12 to 18 inches long; flowers 2½ inches diameter, deep crimson-maroon.

KING OF THE BLACKS (Hurst, Nutting).—Like the last, but stock not true.

BLACK KING (Barr).—Like 'King of the Blacks.' Contained white rogues.

BLACK PRINCE (Dobbie, Daniels).—Like 'King of the Blacks.' The first contained lilac rogues, the second was irregular.

Mixed.

TALL DOUBLE MIXED (W. H. Simpson).—A good strain; mostly of lavender, carmine, and maroon shades.

ANTIRRHINUMS TRIED AT WISLEY, 1931.

AN outdoor trial of Antirrhinums from seed took place at Wisley in 1931, three hundred and forty-nine stocks being sent in for trial. The seed was sown on February 27 and the seedlings were planted out on May 25 in rows 18 inches apart. The dwarf and bedding varieties were planted 9 inches apart in the rows, the intermediate varieties 12 inches, the tall 18 inches. Thirty plants of each stock were grown.

The growth was good and the space available was covered by the plants by the time they were in bloom.

The arrangement of the notes on the trials follows in the main that of the report given in our JOURNAL, **46**, p. 357, but a new class has now been added for " bedding " varieties. The varieties included in this class are between 12 and 18 inches in height, of compact habit, and having many spikes of equal height.

It will be found that the same varietal name appears in several instances in more than one of the four sections. For instance, ' Carmine King ' appears among the tall varieties and among the Intermediate and Bedding varieties as well, but the plants are distinct from one another in habit and height. So, too, with ' Torchlight,' of which there are two distinct stocks, ' Rose King,' with three distinct stocks, ' Guinea Gold ' both tall and intermediate, and so on.

Of the stocks sent in, six sent as unnamed seedlings are omitted, as also are the eleven stocks which failed to germinate, and two which were obviously incorrectly named.

The Committee saw the varieties under trial on several occasions and made final recommendations for awards on August 14.

AWARDS, DESCRIPTIONS, AND NOTES.

Dwarf, Small-flowered Varieties.

Flowers white.

WHITE GEM (Watkins & Simpson).—Spike very short; flowers very small, white, lip lemon. 7 per cent. pink rogues.

Flowers pink.

PINK GEM (Watkins & Simpson).—Spike very short; flowers very small, pale pink; lip yellow. Very variable in shade.

Flowers mixed.

MIXED (Watkins & Simpson).—Spike very short; flowers very small, pink, white, purple and magenta shades.

Dwarf or Tom Thumb Varieties.

Flowers white.

AWARD.

Snowflake, H.C. August 14, 1931. Sent by Messrs. W. H. Simpson, Monument Road, Birmingham.

SNOWFLAKE (W. H. Simpson), **H.C.**—Habit very compact; spike short, blunt, compact; flowers of medium size, creamy-white; lip lemon; height 8 inches.

SNOWFLAKE (Watkins & Simpson).—Habit very compact and bunched; spike short, blunt; flowers of medium size, white; height 9 inches.

WHITE QUEEN (Hurst).—Habit very compact; spike short, tapering; flowers of medium size, white; lip creamy-white; height 9 inches.

Flowers yellow.

AWARDS.

Yellow Prince, A.M. August 14, 1931. Sent by Messrs. Hurst, Houndsditch, London, E.

Yellow, A.M. August 14, 1931. Sent by Messrs. Watkins & Simpson, Drury Lane, Covent Garden, W.C.

YELLOW PRINCE (W. H. Simpson).—Spike short, somewhat tapering; flowers of medium size, pale lemon; height 9 inches.

YELLOW PRINCE (Hurst), **A.M.**—Habit very compact; spike short, somewhat tapering; flowers of medium size, lemon; height 9 inches. Later to flower than the last.

YELLOW (Watkins & Simpson), **A.M.**—Very much like 'Yellow Prince' but spike tapering and flowers a shade darker.

YELLOW (Dobbie).—Like 'Yellow Prince' but germination poor.

Flowers apricot.

APRICOT QUEEN (Dobbie).—Spike short, blunt and very compact; flowers of medium size, pinkish-buff; lip golden; height 9 inches. Distinct from the Bedding variety sent by Messrs. Hurst.

Flowers pink.

AWARD.

Pinkie, H.C. August 14, 1931. Sent by Messrs. Watkins & Simpson.

WILD ROSE (Dobbie).—Spike short, blunt and compact; flowers of medium size, pale rose-pink; tube white; lip lemon at apex; height 10 inches. Variable in shade with 4 per cent. rose-flowered intermediate rogues.

PINKIE (Watkins & Simpson), **H.C.**—Habit compact; spike short, blunt and compact; flowers of medium size, pale rose; tube white; lip lemon at apex; height 10 inches.

Flowers crimson.

AWARD.

Crimson, H.C. August 14, 1931. Sent by Messrs. Dobbie, Edinburgh.

BRILLIANT CRIMSON (Watkins & Simpson).—Habit very compact; spike of medium length, compact; flowers of medium size, crimson; lip old gold; height 8 inches. Variable in shade with 8 per cent. intermediate rogues.

CRIMSON (Dobbie), **H.C.**—Habit very compact; spike short, blunt, compact flowers of medium size, deep crimson; lip maroon; height 8 inches.

CRIMSON KING (Hurst).—Habit of the last; flowers of medium size, crimson maroon; lip old gold. Germination poor. Height 6 inches.

Flowers magenta.

ANTIQUE ROSE (Watkins & Simpson).—Habit very compact; spike very short, blunt, very compact; flowers of medium size, dull rosy-magenta; lip dull yellow; height 5 inches. 10 per cent. intermediate rogues.

RUBY (Watkins & Simpson).—Habit very compact; spike short, somewhat tapering; flowers of medium size, lower lobe magenta, upper deeper; lip golden; height 9 inches.

Bedding Varieties.

Flowers white.

WHITE (Dobbie).—Habit very compact; spike short, somewhat tapering; flowers large, creamy-white; lip lemon; height 12 to 15 inches; 3 per cent. intermediate rogues.

AVALANCHE (Watkins & Simpson).—Habit erect; spike of medium length, blunt, compact; flowers large, creamy-white; lip cream; height 16 inches.

MADONNA IMPROVED (Watkins & Simpson, Barr).—Similar to 'Avalanche.'

IVORINE (Hurst, Barr).—Habit compact; spike long, tapering; flowers large, creamy-white; lip lemon; height 16 to 18 inches. The second stock contained 7 per cent. pink and 3 per cent. purple rogues.

Flowers yellow.

AWARD.

Lady Roberts, H.C. August 14, 1931. Raised and sent by Messrs. W. H. Simpson, Monument Road, Birmingham. [**A.M.** 1920, Simpson.]

LADY ROBERTS (W. H. Simpson), **H.C.**—Habit very compact; spike of medium length, tapering and compact; flowers large, primrose; height 18 inches. A very true and even stock. Also sent by Messrs. Hurst whose stock was much later to flower, otherwise similar.

CANARY BIRD (Benary).—A mixed stock.

SULPHUR QUEEN (Daniels).—Habit compact; spike short, blunt; flowers of medium size, lemon; tube cream; lip golden; height 15 inches.

YELLOW QUEEN (Kelway).—Like 'Sulphur Queen' but variable in colour and habit.

Flowers of pink shades; tube self.

AWARDS.

Carmine King, H.C. August 14, 1931. Raised and sent by Messrs. Hurst.

Cherry Pink, H.C. August 14, 1931. Raised and sent by Messrs. Sutton and sent by Messrs. W. H. Simpson.

CARMINE KING (Hurst), **H.C.**—Habit erect, compact; spike of medium length, tapering; flowers of medium size, deep carmine self; height 18 inches.

CARMINE ROSE (Watkins & Simpson).—Much like 'Carmine King' but dwarfer, 12 inches tall, and flowers paler. 5 per cent. intermediate rogues.

CHERRY PINK (W. H. Simpson), **H.C.**—Habit compact; spike of medium length, somewhat tapering; flowers of medium size, rosy-carmine; tube rose; lip old gold at the apex; height 15 inches.

Flowers pink shades; tube white.

AWARD.

Pale Pink, H.C. August 14, 1931. Sent by Messrs. Watkins & Simpson.

DELICATE PINK (Hurst).—Spike of medium length, tapering; flowers of medium size, pale pink; lip lemon on creamy-white; height 15 inches; variable in shade. No. 2 selection of this variety had larger and darker flowers and contained 4 per cent. intermediate rogues.

CORAL PINK (Watkins & Simpson).—Habit compact and erect; spike of medium length, tapering; flowers of medium size, pale rose-pink; lip lemon; height 15 inches. 16 per cent. colour rogues.

PALE PINK (Watkins & Simpson), **H.C.**—Habit compact and erect; spike of medium length, tapering, somewhat loose; flowers of medium size, bright pale rose-pink; lip lemon; height 15 to 18 inches.

PINK GEM (Hurst).—Habit compact; spike short, blunt, compact; flowers of medium size, rose-pink; lip yellow; height 15 inches; variable in shade with 12 per cent. colour rogues.

Flowers pink or red on yellow.

AWARD.

Amber Queen, H.C. August 14, 1931. Raised and sent by Messrs. Watkins & Simpson, also sent by Messrs. W. H. Simpson.

APRICOT QUEEN (Hurst).—Habit compact; spike short, tapering; flowers of medium size, golden-buff; tube pale rose; lip golden-yellow; height 12 to 15 inches.

LIGHT TERRA-COTTA (Watkins & Simpson).—Habit compact; spike short, blunt, compact; flowers of medium size; upper lobe pinkish amber, lower bronzy old gold; lip old gold; height 12 inches. 20 per cent. colour rogues.

AMBER QUEEN (W. H. Simpson, Watkins & Simpson), **H.C.**—Of erect and compact habit; spike of medium length, blunt, compact; flowers of medium size, upper lobe reddish amber, lower lemon at middle; tube cream; lip deep yellow; height 18 inches.

AMBER QUEEN (Hurst).—Like the last but contained pink and crimson rogues.

Flowers orange-scarlet; tube self.

AWARD.

Spitfire H.C. August 14, 1931. Sent by Messrs. J. R. Pearson, Lowdham, Notts. [**A.M.** 1920, Simpson.]

ORANGE RED (W. H. Simpson).—Habit compact; spike of medium length, tapering; flowers of medium size, orange-scarlet; lip orange; height 15 inches. 15 per cent. colour rogues.

SPITFIRE (Pearson), **H.C.**—Habit erect, very compact; spike short, blunt, compact; flowers of medium size, orange-scarlet self; height 15 inches.

SPITFIRE (Watkins & Simpson).—Characters of the last but flowers paler.

ORANGE SCARLET (Watkins & Simpson).—Characters of 'Spitfire' but flowers paler with orange lip. 10 per cent. colour rogues.

Flowers yellow and red.

FIREFLY (Kelway).—A mixed stock.

Flowers crimson-maroon.

AWARD.

Black Prince, A.M. August 14, 1931. Sent by Messrs. W. H. Simpson, Birmingham.

BLACK PRINCE (W. H. Simpson), **A.M.**—Habit compact; foliage dark green tinged with red; spike of medium length, compact; flowers large, deep crimson-maroon self; height 18 inches. A very good even stock. Distinct from 'Black Prince' of other senders.

Flowers silvery lilac.

SILVER QUEEN (Watkins & Simpson).—Habit erect, very compact; spike of medium length, compact; flowers large, pale silvery-lilac; lip cream; tube rose. A very good even stock.

Intermediate varieties.

Flowers white.

AWARDS.

White Beauty, A.M. August 14, 1931. Raised and sent by Messrs. Dobbie, Edinburgh.

White Queen, H.C. August 14, 1931. Sent by Messrs W. H. Simpson, Birmingham. [**A.M.** 1920, Simpson.]

PURITY (Macdonald Seed Co., Watkins & Simpson, Benary).—Spike long, loose; flowers large, white. The first stock contained magenta, cream and yellow-lipped rogues, the second pink and yellow-lipped rogues, the third purple, cream and many yellow-lipped rogues.

QUEEN OF THE NORTH (Dobbie).—Spike long, somewhat loose; flowers large, white; germination poor.

SNOW QUEEN (Apps).—Like 'Queen of the North.'

WHITE BEAUTY (Dobbie), **A.M.**—Habit compact; spike long, compact; flowers large white, lip cream. A very good even stock.

WHITE WONDER (Hurst, W. H. Simpson, Daniels).—Much like 'White Beauty' but taller. The first stock contained pink rogues, the second and third were true.

WHITE QUEEN (W. H. Simpson), **H.C.**—Habit compact; spike long, compact; flowers large, white, lip cream, tipped yellow. A true even stock.

SNOWSTORM (Benary).—Very similar to 'White Queen' but habit loose and flowers smaller.

WHITE (Watkins & Simpson).—Spike of medium length, somewhat loose; flowers small, white, lip lemon.

APHRODITE (W. H. Simpson, Dickson & Robinson).—Spike long, compact; flowers large, creamy-white, lip cream, tipped yellow. The second stock contained pink rogues.

Flowers of yellow shades.

AWARDS.

Golden Gem, A.M. August 14, 1931. Sent by Messrs. W. H. Simpson, Birmingham. [**A.M.** 1920.]

Golden Queen, A.M. August 14, 1931. Sent by Messrs. Hurst, Houndsditch.

Golden Monarch, H.C. August 14, 1931. Sent by Messrs. Watkins & Simpson and Messrs. Morris, Birmingham.

DAFFODIL (Watkins & Simpson).—Habit compact; spike short, blunt, flowers of medium size, sulphur; lip deep yellow. A true even stock.

PRIMROSE MONARCH (Watkins & Simpson, W. H. Simpson).—Spike short, blunt; flowers of medium size, primrose; lip lemon. The first stock contained crimson and deep yellow rogues, the second was true.

PRIMROSE (Watkins & Simpson).—Much like 'Primrose Monarch' but dwarfer with larger flowers on a tapering spike. 12 per cent. colour rogues.

GOLDEN KING (Macdonald Seed Co.).—Spike of medium length, compact; flowers large, pale lemon; lip deep yellow. Height 26 inches.

GOLDEN KING (Waller-Franklin Seed Co.).—Very similar to the last but flowers of a deeper shade.

CEYLON COURT (Macdonald Seed Co., Waller-Franklin Seed Co., Vaughan's Seed Store).—Spike long, compact; flowers large, lemon; lip golden; height 26 inches. The first and third stocks contained pink and copper rogues and were variable in shade.

GOLDEN GEM (W. H. Simpson), **A.M.**—Foliage dull grey-green; spike long, compact; flowers large, lemon; lip deep yellow. A very good even stock.

GOLDEN MONARCH (Watkins & Simpson, Morris), **H.C.**—Habit compact; spike long, compact; flowers large, lemon; tube cream; lip deep yellow.

GOLDEN MONARCH (Dobbie, Hurst).—Like the last. The first stock contained rose-pink rogues; the second 50 per cent. orange-pink rogues.

YELLOW BEAUTY (Pearson).—Like 'Golden Monarch.'

YELLOW QUEEN (Dobbie).—Like 'Golden Monarch' but later to flower. Germination poor.

MAJESTIC ELDORADO (Watkins & Simpson, Morris).—Spike short, blunt; flowers very large, lemon; lip tipped golden-yellow. Stocks contained pink and magenta rogues.

GUINEA GOLD (Webb).—Spike long; flowers large, upper lobe lemon, lower bright yellow; lip golden.

GOLDEN QUEEN (Hurst), **A.M.**—Habit compact; spike short, blunt; flowers large, bright yellow; tube cream; lip golden. A very good even stock.

GOLDEN QUEEN (Macdonald Seed Co., Watkins & Simpson, Dobbie).—Like the last but all contained colour rogues and were variable in shade.

Flowers pink shades; tube white.

AWARD.

Exquisite, H.C. August 14, 1931. Raised and sent by Messrs. Hurst, Houndsditch, London.

EXQUISITE (Hurst), **H.C.**—Habit compact; spike long, compact; flowers large, pale rose-pink; lip cream tipped yellow. Height 26 inches.

EXQUISITE (W. H. Simpson, Watkins & Simpson, Dobbie).—Like the last. The germination of the first stock was bad, the second contained pink and the third magenta rogues.

MELODY (Watkins & Simpson).—Habit compact; foliage very dark glossy green; spike long; flowers large, pale rose-pink; lip sulphur. Late flowering. Contained crimson and amber rogues.

BONNY LASS (Watkins & Simpson)—Habit compact; spike of medium length; flowers large, rose-pink; lip tipped lemon. A good even stock.

GAIETY (Pearson).—Habit compact; spike of medium length, compact; flowers large, rosy-red; lip tipped yellow. Height 18 to 20 inches. A true even stock.

DAPHNE (Hurst).—Spike of medium length, compact; flowers large, upper lobe cerise, lower white edged cerise; lip cream tipped yellow; height 26 inches. Crimson and deep cerise rogues.

Flowers pink shades; tube self.

AWARDS.

Charm, A.M. August 14, 1931. Raised by Messrs. Watkins & Simpson, and sent by Messrs. W. H. Simpson.

Nelrose, A.M. August 14, 1931. Sent by Messrs. Hurst.

Silver Pink, H.C. August 14, 1931. Raised and sent by the Waller-Franklin Seed Co., Guadalupe, California, U.S.A., and by the Macdonald Seed Co., Santa Maria, California, U.S.A.

Nelrose, H.C. August 14, 1931. Sent by Messrs. Watkins & Simpson.

Rose Eclipse, H.C. August 14, 1931. Raised and sent by Messrs. Hurst.

Carmine King, H.C. August 14, 1931. Sent by Messrs. Hurst.

ROSE FRANCE (Benary).—Spike of medium length, somewhat blunt; flowers large, blush-pink; lip cream. Very variable in shade.

JENNIE SCHNEIDER (Macdonald Seed Co.).—A mixed stock.

SILVER PINK (Waller-Franklin, Macdonald Seed Co.), **H.C.**—Habit compact; spike of medium length, compact; flowers large, soft pale rose-pink; lip tipped yellow.

FAIR MAID (W. H. Simpson).—Germination bad.

FASCINATION (Hurst).—Spike short, blunt, compact; flowers of medium size, pale rose-pink; lip tipped yellow. The original stock of this variety.

FASCINATION (Watkins & Simpson, W. H. Simpson, Dickson & Robinson).—Distinct from the last stock; much later to flower, with larger and deeper-coloured flowers on longer spikes.

PEERLESS PINK (Waller-Franklin).—Spike long; flowers large; pale rose-pink; lip tipped with yellow. Contained 3 per cent. magenta rogues.

ENCHANTRESS (Watkins & Simpson).—Much like 'Peerless Pink' but somewhat darker and lip of the flowers cream. Variable in shade with 7 per cent. colour rogues.

CHARM (W. H. Simpson), **A.M.**—Of erect, compact habit; spike of medium length, compact; flowers large, rose-pink; lip tipped yellow. A very good even stock.

CHARM (Watkins & Simpson, Morris).—Less regular stocks of the last.

MAJESTIC ROSE PINK SELF (Watkins & Simpson).—Spike long; flowers very large, rose-pink; lip tipped deep cream; height 28 inches. Variable in shade.

QUEEN MARY (Pearson).—Habit compact; spike long; flowers large, rose-pink; lip tipped yellow. Late flowering. 13 per cent. amber rogues.

ROSEUM SUPERBUM (W. H. Simpson).—Spike long, compact; flowers large, deep rose-pink, lip tipped with yellow. A true even stock.

NELROSE (Hurst), **A.M.**—Much like 'Roseum Superbum' but flowers of a deeper and brighter shade of rose-pink.

NELROSE (Benary).—A mixed stock of the last.

NELROSE (Watkins & Simpson), **H.C.**—Distinct from the foregoing stocks of this variety; flowers of a richer shade of rose-pink.

NELROSE RE-SELECTED (Carter's Tested Seeds).—An irregular stock of the last.

QUEEN OF THE PINKS (Webb).—An irregular stock of 'Roseum Superbum.'

PINK PERFECTION (Waller-Franklin Seed Co., Watkins & Simpson).—Very similar to 'Roseum Superbum' but variable in shade with white-tube rogues.

PHILADELPHIA PINK (Macdonald Seed Co.).—A variable stock of 'Roseum Superbum,' with apricot and amber-flowered rogues.

ROSE QUEEN (Hurst).—Habit compact; spike long, compact; flowers large, rose, lip tipped with yellow; height 20 inches. A true even stock. No. 3 selection of this variety contained crimson and pale rose-flowered rogues.

GLORIA (Watkins & Simpson, Macdonald Seed Co.).—Very similar to 'Rose Queen' except that the flower spike is shorter and the lip cream tipped yellow. The second stock contained 16 per cent. colour rogues and varied in shade

ROSE MARIE (Watkins & Simpson, Morris).—Darker than 'Gloria' stocks not true.

CHEVIOT MAID (Macdonald Seed Co.).—Very similar to 'Gloria' but in shade and contained 10 per cent. colour rogues.

ROSE ECLIPSE (Hurst), **H.C.**—Habit compact; spike long, compact large, rose, lip tipped deep cream; height 26 inches. A true even st

ROMANCE (W. H. Simpson).—Too much like 'Rose Eclipse.'

ROSE DORÉ (Watkins & Simpson, Pearson).—Habit compact; compact; flowers large, deep rose, lip tipped with old gold. Th et; spike contained 6 per cent. purple rogues.

LAURA (Waller-Franklin, Macdonald Seed Co.).—Spike long, compact; flowers large, deep rose, lip gold. Stocks not true.

BEACON (W. H. Simpson, Morris, Hurst, Watkins & Simpson).—Habit compact; spike long, compact; flowers large, rosy-salmon, lip orange. The first, third and fourth stocks were very true and even, the second contained 55 per cent. colour rogues.

RADIANCE (Watkins & Simpson).—Habit compact; spike long, compact; flowers large, salmon, lip orange. 10 per cent. colour rogues.

CARMINE KING (Hurst), **H.C.**—Habit very compact; spike long; flowers large rich carmine-red, lip tipped with orange; height 26 inches. Distinct from the Bedding variety.

CARMINE QUEEN (Dobbie).—Spike long, compact; flowers large, rich carmine, lip tipped with orange. Late flowering.

CARMINE QUEEN (W. H. Simpson).—Distinct from the last. Flowers and lip paler, also earlier to flower.

CHERRY RIPE (W. H. Simpson).—Spike long; flowers large, rosy-carmine, lip orange; height 26 inches.

Flowers rose, edged cream; tube cream.

AWARD.

Ladybird, H.C. August 14, 1931. Raised and sent by Messrs. Hurst; also sent by Messrs. Watkins & Simpson.

LADYBIRD (Hurst, Watkins & Simpson), **H.C.**—Habit compact; spike long, compact; flowers large, rose edged with cream; lip cream.

LADYBIRD (Benary, Dobbie).—Like the last but stocks not true.

Flowers pink or red on yellow (shot shades).

AWARDS.

Picture, A.M. August 14, 1931. Sent by Messrs. Watkins & Simpson, Dobbie, and Webb.

Victory, A.M. August 14, 1931. Raised and sent by Messrs. Watkins & Simpson; also sent by Messrs. W. H. Simpson.

Appleby Mathews, A.M. August 14, 1931. Raised and sent by Messrs. W. H. Simpson; also sent by Carter's Tested Seeds, Raynes Park, S.W.

Prima Donna, H.C. August 14, 1931. Raised and sent by Messrs. Dobbie; also sent by Messrs. Watkins & Simpson.

Majestic Golden Dawn, H.C. August 14, 1931. Raised and sent by Messrs. Watkins & Simpson; also sent by Messrs. R. A. Morris, Birmingham.

Majestic Sunset, H.C. August 14, 1931. Raised by Messrs. Watkins & Simpson, sent by Messrs. Hurst and Messrs. W. H. Simpson.

SYBIL ECKFORD (W. H. Simpson).—Habit compact; spike of medium length, blunt; flowers large, upper lobe pale buff, lower sulphur edged buff; tube white; lip sulphur.

SYBIL ECKFORD (Hurst).—Distinct from the last; flowers of a pinker shade.

MAIZE QUEEN (Dobbie).—Spike of medium length, somewhat blunt; flowers large, upper lobe lemon shaded buff, lower bright lemon; tube pale rose; lip lemon. A true even stock.

ROMAN GOLD (Waller-Franklin).—Spike long; flowers large, upper lobe pale pink on yellow, lower yellowish-gold; tube pale rose; lip yellowish-gold; height 26 inches. A true stock.

QUEEN OF BEDDERS (Dickson & Robinson).—Much like 'Roman Gold' but tube much darker and variable in shade. White-tube rogues.

FAWN (Macdonald Seed Co.).—Spike short, blunt; flowers large, upper green pinkish-buff; lower lobe lemon-shaded buff; tube pale rose.

PRIMA DONNA (Dobbie, Watkins & Simpson), **H.C.**—Spike short, blunt, broad; flowers large, pinkish terra-cotta; tube cream; lip tipped yellow.

PRIMA DONNA (Macdonald Seed Co., Dickson & Robinson).—Like the last; length of spike and habit not true.

PRIMA DONNA (W. H. Simpson, Hurst).—Distinct from 'Prima Donna' of flowers even stockers, spike larger and tapering; flowers paler, of a pinker shade.

DAPHNE (Watkins & Simpson, Dobbie, Webb), **A.M.**—Habit compact; spike medium length, tapering; flowers large, pale pinkish-buff; tube cream; lobe cerise, Crimson and

PICTURE (Hurst, Benary).—Like the last but contained amber-flowered rogues.

APRICOT (Watkins & Simpson).—Very similar to 'Picture' but flowers paler and tube pale rose.

MAJESTIC TWILIGHT (W. H. Simpson, Morris).—Very similar to 'Picture' but flowers longer and tube pale rose. The first stock was true, the second variable in shade with pink and amber rogues.

MAJESTIC SOFT SALMON-PINK SHADED APRICOT (Watkins & Simpson).—Spike of medium length; flowers large, soft apricot-pink; tube pale rose; lip yellow. Stock variable in shade with apricot and pink rogues.

ESTELLE (Dickson & Robinson).—Very similar to the last.

SUNRISE (Hurst).—Spike of medium length, compact; flowers large, pinkish-amber; tube cream; lip yellow. Stock contained pink rogues.

ORANGE GLOW (Hurst, Morris).—Habit very compact; flowers large, upper lobe rosy-buff, lower orange-buff; lip yellow.

MAJESTIC GOLDEN DAWN (Watkins & Simpson, Morris), **H.C.**—Spike long, compact; flowers very large, upper lobe orange-pink, lower orange; tube rose; lip orange. True even stocks.

MAJESTIC SUNSET (Hurst, W. H. Simpson), **H.C.**—Habit compact; spike long, compact; flowers large, orange-cerise; lip yellow. Very true and even stocks.

MAJESTIC SUNSET (Barr).—Like the last but variable in shade with yellow and red rogues.

MAJESTIC SUNSET (Watkins & Simpson).—Distinct from 'Majestic Sunset' of other senders. Flowers salmon-orange; lip orange. A darker selection.

VICTORY (Watkins & Simpson, W. H. Simpson), **A.M.**—Habit compact; spike long, compact; flowers large, soft pale salmon-apricot; tube rose; lip pale orange. Very true and even stock.

VICTORY (Hurst, Dickson & Robinson, Benary, Dobbie, Pearson).—Like the last but stocks not true.

APPLEBY MATHEWS (W. H. Simpson, Carter's Tested Seeds), **A.M.**—Habit compact; spike long, compact; flowers large, orange shaded rose; tube white, lip yellow. Very true and even stocks.

APPLEBY MATHEWS (Dickson & Robinson).—Like the last but not true.

FIREGLOW (Apps).—Near 'Appleby Mathews' in colour but spikes short and blunt and stock very variable in shade.

Flowers orange.

AWARDS.

Morning Glow, A.M. August 14, 1931. Raised and sent by Messrs. Watkins & Simpson; also sent by Messrs. W. H. Simpson and Messrs. Dickson & Robinson as **'Aurore,'** this shares the award.

Majestic Orange King, H.C. August 14, 1931. Raised by Messrs. Watkins & Simpson and sent by Messrs. W. H. Simpson and Messrs. Hurst.

ELECTRA (Watkins & Simpson).—Habit very compact; spike long, compact; flowers large, orange; tube white; lip red on orange. Stock not true.

MAJESTIC ORANGE KING (W. H. Simpson, Hurst), **H.C.**—Habit compact; spike long, compact; flowers large, orange; tube pale rose; lip yellow.

MAJESTIC ORANGE KING (Watkins & Simpson, Barr, Morris).—Like the last but stocks not true.

ORANGE QUEEN (Watkins & Simpson).—Spike long, compact; flowers large, bronzy-orange; tube rose; lip old gold. Stock not true.

CLIMAX (Watkins & Simpson).—Too much like 'Orange Queen' but plants taller; variable in shade.

MORNING GLOW (Watkins & Simpson), **A.M.**—Habit compact; spike long, compact; flowers of medium size, bronzy-orange shaded terra-cotta; tub rose; lip yellow; height 30 inches.

AURORE (W. H. Simpson, Dickson & Robinson), **A.M.**—Like 'Morning Glo from which it was renamed.

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apson].

Flowers red and yellow; tube white.

AWARDS.

dinburgh.

Admiration, H.C. August 14, 1931. Sent by Messrs. Hurst.

Gay Gordon, H.C. August 14, 1931. Raised and sent by Messrs. et; spike also sent by Messrs. Barr and Messrs. Pearson. ck.

ADMIRATION (Hurst), **H.C.**—Habit compact; spike long, compact; flowers large, upper lobe sulphur edged rosy-red, lower sulphur, lip lemon; tube white.

GAY GORDON (Dobbie, Barr, Pearson), **H.C.**—Habit very compact; spike of medium length, compact; flowers large, upper lobe pale orange-scarlet, lower yellow edged orange-scarlet; lip yellow; tube cream.

REMBRANDT (Hurst, Heinemann).—Spike long, compact; flowers large, orange-scarlet broadly edged with yellow; lip orange-scarlet; tube cream. Stocks variable in shade.

Flowers orange-scarlet; tube white.

AWARD.

Aurora, H.C. August 14, 1931. Sent by Messrs. Hurst; also sent by Messrs. Benary, Erfurt, Germany as '**Morgenroete**' which shares the award.

ADVANCE (Watkins & Simpson, W. H. Simpson).—Spike of medium length, compact; flowers large, upper lobe rosy-red, lower orange-scarlet. The first stock contained pink and white rogues, the second was true.

AURORA (Hurst), **H.C.**—Habit compact; spike long, compact; flowers large, scarlet.

MORGENROETE (Benary), **H.C.**—Like 'Aurora.'

FIERY BELT (Watkins & Simpson).—Spike long, compact; flowers large, orange-scarlet. Stock not true.

Flowers orange-scarlet; tube self.

BONFIRE (Hurst, Watkins & Simpson).—Spike long, compact; flowers large, orange shaded red; lip tipped old gold.

VESUVIUS (Watkins & Simpson).—Very variable in shade with rose and orange rogues.

HIS EXCELLENCY (Hurst, Webb, Benary).—Habit compact; spike long, compact; flowers bright orange-scarlet self. Stocks not true.

MRS. R. F. FELTON (W. H. Simpson, Dickson & Robinson).—Habit compact; spike long; flowers large, bright orange-scarlet self. Stocks contained white-tube rogues.

Flowers scarlet.

AWARDS.

Flame, A.M. August 14, 1931. Sent by Messrs. J. R. Pearson, Lowdham, Notts.

Afterglow, H.C. August 14, 1931. Raised and sent by Messrs. W. H. Simpson, Birmingham. [**A.M.** 1920. Simpson].

Volcano, H.C. August 14, 1931. Raised and sent by Messrs. J. Kelway, Langport, Somerset; also sent by Messrs. Daniels, Norwich.

DAZZLER (Watkins & Simpson, W. H. Simpson).—Spike long, compact; flowers large, scarlet, lip orange-scarlet; height 30 inches.

AFTERGLOW (W. H. Simpson), **H.C.**—Habit compact; foliage dark green; spike long, compact; flowers large, scarlet. A good even stock.

VOLCANO (Kelway, Daniels), **H.C.**—Much like 'Afterglow' but flowers darker.

FLAME (Pearson), **A.M.**—Much like 'Afterglow' but flowers larger and much darker. A very good even stock.

FLAME (Nutting, Watkins & Simpson).—Like the last but variable in shade with orange-scarlet rogues.

SCARLET FLAME (Carter's Tested Seeds).—Like 'Flame.' Contained pink and orange-scarlet rogues.

FIREBRAND (Webb).—Like 'Flame.' Stock not true.

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Flowers crimson.

AWARD.

GA**llipse, A.M.** August 14, 1931. Raised and sent by Messrs. Hurst; also sent
flowers srs. W. H. Simpson and Messrs. Dickson & Robinson, Cathedral Street,
even stc ter.

DAPH
lobe ceris EMPEROR (Webb, Benary).—Habit compact; spike long; flowers
Crimson an on; lip orange-scarlet. The second stock was not true.

RED CHIEF (Barr, Watkins & Simpson).—Much like 'Red Emperor' but dwarfer and flowers of a brighter colour; lip tipped orange. The first stock contained apricot rogues.

ATROCOCCINEUM (Apps).—Spike of medium length, blunt; flowers large, crimson; lip orange.

CRIMSON KING (Dickson & Robinson).—A mixed stock.

ECLIPSE (Hurst, W. H. Simpson, Dickson & Robinson), **A.M.**—Habit compact; spike long, compact; flowers large, bright crimson self; height 28 inches. True and even stocks.

ECLIPSE (Nutting).—An untrue stock of the last.

EMPRESS (W. H. Simpson, Watkins & Simpson, Macdonald Seed Co.).—Spike long, compact; flowers large, deep crimson; lip tipped with orange. The third stock was untrue.

CRIMSON GLOW (Carter's Tested Seeds).—Much like 'Empress' but flowers darker and self coloured.

CRIMSON GLOW (Stuart & Mein).—A mixed stock.

CRIMSON KING (Hurst).—Habit compact; foliage very dark green; spike long, compact; flowers large, deep crimson self. A very good even stock.

CRIMSON QUEEN (Dobbie).—Very similar to 'Crimson King,' except that the flowers are purplish-crimson; lip tipped with orange. A good even stock.

Flowers crimson-maroon.

BLACK PRINCE (Hurst, Watkins & Simpson, Apps).—Foliage dark green tinged with red; spike long, somewhat loose; flowers of medium size; deep crimson-maroon self; height 24 inches. Distinct from the Bedding variety under this name.

Flowers purple.

PURPLE ROBE (W. H. Simpson, Benary).—Spike long, compact; flowers large, purplish-magenta self. The second stock was very variable in shade.

Flowers mixed.

GIANT FLOWERED MIXED (Hurst).—Mostly of pink and orange shades.

Tall Varieties.

Flowers white.

AWARD.

Queen Victoria, A.M. August 14, 1931. Sent by Messrs. Waller-Franklin Seed Co. [**C.** 1920. Barr.]

WHITE WINGS (W. H. Simpson, Dickson & Robinson).—Spike long, compact; flowers large, white; lip tipped with yellow; height 3½ feet. The first stock was true, the second contained cream rogues.

WHITE KING (Dobbie).—Spike long, somewhat loose; flowers large, white; lip tipped with yellow; height 3 feet. Lilac rogues.

QUEEN VICTORIA (Waller-Franklin), **A.M.**—Plant compact; spike long, compact; flowers large, white; lip tipped with yellow; height 3½ to 4 feet. A true even stock.

QUEEN VICTORIA (Hurst, Macdonald Seed Co., Benary).—Like the last. Stocks not true.

WHITE ROCK (Waller-Franklin).—Too much like 'Queen Victoria.'

MONA LISA (Barr).—Spike long; flowers large, white; lip yellow. Stock not true.

Flowers yellow.

AWARDS.

Yellow King, A.M. August 14, 1931. Raised and sent by Messrs. Watkins & Simpson, also sent by Messrs. W. H. Simpson [**A.M.** 1920. Watkins & Simpson]. Also **Highly Commended** as sent by Messrs. Dickson & Robinson.

Primrose King, H.C. August 14, 1931. Sent by Messrs. Dobbie, Edinburgh.

PRIMROSE KING (Dobbie), **H.C.**—Habit compact; height 2½ feet; spike long, compact; flowers large, cream; lip cream. A true even stock.

GOLDEN QUEEN (Barr).—Spike long; flowers large, sulphur; tube rosy-purple; lip deep yellow. Stock not true.

CANARY BIRD (Benary).—Height 3½ feet; spike long; flowers large, lemon; lip deep yellow. Stock not true.

YELLOW KING (Watkins & Simpson, W. H. Simpson), **A.M.**—Height 3½ feet; spike long, compact; flowers very large, lemon; lip deep yellow. True even stocks.

YELLOW KING (Dickson & Robinson), **H.C.**—Like the last but a less regular stock.

YELLOW KING (Dobbie).—Like the last but not true.

Flowers of pink shades; tube white.

PINK DOMINO (Hurst).—Height 2½ feet; spike long, compact; flowers large, pale rose; lip tipped yellow; tube creamy-white. Stock not true.

ENCHANTRESS (Hurst).—Very similar to 'Pink Domino,' somewhat taller and a deeper shade. A true even stock.

COTTAGE MAID (Dobbie).—Much like 'Enchantress' but of a deeper shade. Stock not true.

Flowers of pink shades; tube self.

AWARD.

Princess Elizabeth, H.C. August 14, 1931. Raised and sent by Messrs. W. H. Simpson; also sent by Messrs. Dickson & Robinson.

PRINCESS PATRICIA (Hurst).—Habit compact; spike long, compact; flowers large, pale rose-pink; lip cream. Stock not true.

PRINCESS ELIZABETH (W. H. Simpson, Dickson & Robinson), **H.C.**—Height 2½ feet. Very similar to 'Princess Patricia' but flowers of a richer and softer shade. Very good even stocks.

HARMONY (Waller-Franklin Seed Co., Hurst, Watkins & Simpson).—Height 2½ feet; of compact habit; spike long; flowers large, pale rose-pink; lip pale yellow. The second stock was not true.

GOLIATH (Watkins & Simpson).—Height 2½ feet; spike long, compact; flowers large, soft rose-pink; lip yellow. Variable in shade.

BEAUTY (W. H. Simpson).—Very similar to 'Goliath' but flowers darker with an orange lip. Stock not true, orange rogues.

FELTHAM BEAUTY (Watkins & Simpson).—Height 2½ feet; spike long; flowers large, rose-pink; lip cream tipped yellow. Germination poor.

AUTUMN GLOW (Waller-Franklin).—Height 3 feet; spike long, compact; flowers large, rose-pink; lip sulphur. Stock not true, purple rogues.

ROSE QUEEN (Waller-Franklin, Hurst).—Height 2½ feet; spike long; flowers large, rose-pink; lip tipped yellow. Stocks not true.

SALMON ROSE (Waller-Franklin).—Much like 'Rose Queen' but a shade darker. Variable in habit and shade.

ROSE KING (Waller-Franklin, Macdonald Seed Co.).—Very similar to 'Rose Queen' but dwarfer, and flowers somewhat darker.

ROSE KING (Watkins & Simpson).—Taller, with deeper rose flowers, lip tipped with orange, than the last.

ROSE (Waller-Franklin, Daniels, Barr, Heinemann, Benary).—Very similar to 'Rose King.' Stocks not true.

ROSE KING (W. H. Simpson).—Distinct from the foregoing 'Rose King.' Flowers deep rose, edged cream; variable in shade.

CARMINE KING (Hurst).—Height 3½ feet; spike long, compact; flowers large, deep rosy-carmine self. Contained white-tube rogues.

Flowers pink or red on yellow.

AWARDS.

en Garde, H.C. August 14, 1931. Raised and sent by Messrs. Hurst.

Peachblow, H.C. August 14, 1931. Sent by Messrs. Watkins & Simpson and Messrs. Hurst.

ATTRACTION (Hurst, Dobbie).—Height 3½ feet; spike long, compact; flowers large, upper lobe sulphur tinged pink; lower sulphur; lip orange. The first was true, the second with bronze and red rogues.

EN GARDE (Hurst), **H.C.**—Characters of the last except the flowers; upper lobe apricot pink, lower sulphur edged apricot pink; tube creamy-white; lip yellow.

PEACHBLOW (Watkins & Simpson, Hurst), **H.C.**—Height 3 feet; spike long, compact; flowers large, upper lobe rosy-lilac, lower yellow tinged rosy-lilac; tube cream; lip yellow.

Flowers lilac.

ROMEO (Benary).—Height 3½ feet; spike long; flowers large, lilac; lip cream. Variable in shade.

Flowers orange.

OUR PRINCE (W. H. Simpson, Dickson & Robinson).—Height 3½ feet; spike long, compact; flowers large, orange, lip old gold; tube cream.

OLD GOLD (Daniels).—Height 3½ feet; habit compact; spike long; flowers orange, tube rose. Variable in shade with pink and purple rogues.

Flowers orange and terra-cotta shades.

AWARDS.

Apricot King, A.M. August 14, 1931. Raised and sent by Messrs. W. H. Simpson.

Moonlight, H.C. August 14, 1931. Sent by Messrs. Hurst.

MOONLIGHT (Hurst), **H.C.**—Height 3½ feet; spike long, compact; flowers large, orange-pink; lip orange; tube rose. A true even stock.

GOLDEN CHAMOIS (Barr).—Habit of 'Moonlight'; flowers large, orange-buff. Variable in shade.

APRICOT (Barr).—Very similar to 'Golden Chamois' but flowers a shade darker.

TORCHLIGHT (Dickson & Robinson).—Height 2½ feet; spike long; flowers large, bright orange terra-cotta, middle of lower lobe paler; lip yellow; tube cream. Distinct from Messrs. Watkins & Simpson's variety of this name.

APRICOT KING (W. H. Simpson), **A.M.**—Height 3 feet; spike long, compact; flowers very large, bright orange-apricot with a golden sheen; lip orange-scarlet tipped orange; tube rose. A very good even stock.

C. H. HERBERT (W. H. Simpson, Dickson & Robinson).—Height 3½ feet; spike long, compact; flowers very large bronzy old gold; lip old gold; tube rose.

GUINEA GOLD (Hurst).—Very similar to 'C. H. Herbert,' but flowers smaller and of a pinker shade.

Flowers orange-scarlet.

RED EMPEROR (Watkins & Simpson).—Height 3 feet; spike long; flowers large, orange-scarlet. Contained white-tube rogues.

SCARLET PRINCE (Dobbie).—Height 3 feet; habit compact; spike long, compact; flowers orange-scarlet; lip orange.

CARDINAL (Benary).—A very variable stock of 'Scarlet Prince,' with pink and carmine rogues.

Flowers scarlet.

AWARDS.

King, A.M. August 14, 1931. Raised and sent by Messrs. W. H. Simpson. [**H.C.** 1920. Simpson.]

Sentinel, H.C. August 14, 1931. Sent by Messrs. Dobbie and Messrs. Watkins & Simpson.

TORCHLIGHT (Watkins & Simpson).—Height 2½ feet; habit compact; flowers large, rosy-scarlet, middle of lower lobe and lip yellow; tube cream.

KING (W. H. Simpson), **A.M.**—A brighter and lighter shade of scarlet than 'Sentinel.' A very good even stock.

SENTINEL (Dobbie, Watkins & Simpson), **H.C.**—Height 3 feet; spike long; flowers large, scarlet; lip tipped orange; tube creamy-white.

SENTINEL (Hurst, Barr).—Like the last but contained pink rogues.

Flowers crimson.

CRIMSON KING (Dobbie, Macdonald Seed Co.).—Height 2½ feet; foliage very dark green; spike long; flowers large, crimson self. The second stock was very variable in shade.

PURPLE KING (Barr).—Height 4½ feet; foliage very dark green; spike long, compact; flowers large, bright crimson. Paler and brighter than 'Monarch.'

MONARCH (Hurst, W. H. Simpson).—Very similar to 'Purple King' but flowers of a darker and duller shade of crimson. The second was a true and even stock.

Flowers crimson and yellow.

DIAMOND (Barr).—Height 4 feet; spike long; flowers large, rosy-crimson, middle of lower lobe and lip yellow; tube creamy-white. Very variable in shade.

COPPER KING (Barr).—Habit of 'Diamond'; flowers crimson-bronze, lip orange; tube rosy-purple. Variable in shade.

Flowers parti-coloured.

FABULOUS (Heinemann).—Height 3 feet; spike long; flowers large, shades of apricot and magenta splashed with yellow.

CELERY TRIED AT WISLEY, 1931.

EIGHTY-THREE stocks of Celery were sent for trial and sown on March 17. They were planted out in trenches 12 inches apart in the row and earthed up from August 15 onwards. A small outbreak of Celery leaf-spot occurred on a few varieties, but was effectively checked by periodical spraying with Bordeaux mixture, commencing at the beginning of August. The celery fly gave no trouble.

The early self-blanching types were judged on October 14, the remainder on November 19. Awards made are set out below.

AWARDS, DESCRIPTIONS, AND NOTES.

White Varieties.

Both inner and outer leaf-stalks white.

Self-blanching, maturing early.

AWARDS.

Golden Phenomenal, H.C. October 14, 1931. Raised and sent by Messrs. Ferry-Morse, San Francisco, U.S.A. Also sent by Messrs. Clucas, Ormskirk, as **A1 Blanching**; this shares the award.

Florida Golden, H.C. October 14, 1931. Raised and sent by Messrs. Ferry-Morse.

WHITE PLUME (Ferry-Morse, Kelway).—Height 2 feet, thick; foliage pale green, variegated with white; heart solid; flesh crisp; flavour poor. 14 per cent. bolting.

GOLDEN PLUME (Clucas, Benary).—Height 26 inches, thick; foliage medium yellowish-green; heart solid; flesh crisp; leaf-stalk thick; flavour poor.

DWARF SELF-BLANCHING (Clucas).—Very similar to 'Golden Plume'; sticks not so thick and dwarfer, 21 inches.

DWARF GOLDEN SELF-BLANCHING (Ferry-Morse).—Like 'Dwarf Self-blanching.'

GOLDEN PHENOMENAL (Ferry-Morse), **H.C.**—Height 26 inches, thick; foliage medium yellowish-green; leaf-stalk thick and broad; heart very solid; flesh crisp; flavour poor. A good even stock.

A1 BLANCHING (Clucas), **H.C.**—Similar to 'Golden Phenomenal.'

FLORIDA GOLDEN (Ferry-Morse), **H.C.**—Height 24 inches, very thick; foliage medium yellowish-green; leaf-stalk thick and very broad; flesh crisp; heart very solid; flavour poor. A very good even stock.

DORÉ FRISÉ (Rivoire).—Height 2 feet, thick; foliage pale yellowish-green, deeply cut and curled; leaf-stalk thick; heart somewhat solid; flavour poor. Raised by sender.

Early.

AWARDS.

Special Market White, A.M: November 19, 1931. Raised and sent by Messrs. Clucas.

Dwarf White Gem, H.C. November 19, 1931. Sent by Messrs. Watkins & Simpson, Drury Lane, Covent Garden, W.C.

À FEUILLE LACINCÉE (Rivoire).—Height 20 inches, medium thick; foliage dark green, deeply and finely divided; leaf-stalks of medium thickness; flesh somewhat stringy; flavour poor; heart loose; not hardy. Raised by sender. 50 per cent. bolting.

DWARF WHITE GEM (Watkins & Simpson), **H.C.**—Height 20 inches, thick; leaf-stalks thick, broad; heart very solid; flesh crisp; flavour good. A good even stock.

SANDRINGHAM (Hurst).—Very similar to 'Dwarf White Gem,' but taller. A good stock.

DE TOULOUSE (Rivoire).—Height 22 inches, thick; foliage pale green; leaf-stalk thick; heart solid; flesh soft and pithy; flavour poor. Irregular in height. Damaged by frost.

WHITE PERFECTION (Watkins & Simpson).—Height 26 inches. Very similar to 'Sandringham,' but taller and leaf-stalks not so broad. Many suckers.

PERFECTION WHITE (Harrison).—Very similar to 'White Perfection,' except that the foliage is darker and flesh soft. Many suckers.

DWARF WHITE (Speed).—Height 26 inches, thick; leaf-stalks thick; heart solid; flesh soft; flavour poor; many suckers. A true stock.

PRIZE WHITE (Brown).—Very similar to 'Dwarf White,' but with broader and thicker leaf-stalks; does not blanch readily.

SPECIAL MARKET WHITE (Clucas), **A.M.**—Height 26 inches, very thick; leaf-stalks very thick and broad; heart very solid; flesh crisp; flavour good, nutty; blanches readily. A very good even stock.

WAREING'S WHITE (Clucas).—Much like 'Special Market White,' but irregular in height and does not blanch so readily. Raised by Mr. Wareing.

WHITE QUEEN (Dobbie).—Much like 'Special Market White,' but sticks not so large and less compact; leaf-stalks not so broad; flesh soft. Raised by sender.

GIANT SOLID WHITE (Kelway, Yates).—Very poor irregular stocks; the second contained 50 per cent. bolters.

PRIZE WHITE (Nutting).—Height 30 inches, of medium thickness; leaf-stalks of medium width; heart solid; flesh soft; flavour poor; many suckers. Damaged by weather.

BLUNDELL'S WHITE (Clucas).—Height 38 inches, of medium thickness; leaf-stalks of medium width; heart solid; flesh soft; flavour good. A good even stock. Raised by Mr. Blundell.

Later.

AWARD.

Defiance White, H.C. November 19, 1931. Raised by Mr. Bibby and sent by Messrs. Apps.

GIANT PASCAL (Ferry-Morse, Benary).—Height 22 inches, thick; leaf-stalks thick, broad; heart solid; flesh soft, pithy; flavour bitter. 15 per cent. bolting. Did not stand.

SOLID WHITE (W. H. Simpson).—Height 28 inches, thick; leaf-stalks thick, broad; heart solid; flesh crisp; flavour good, nutty.

SELECT SOLID WHITE (Hurst).—Very similar to 'Solid White,' but leaf-stalks not so broad at the base. A good even stock.

DARRAGH'S WHITE (Clucas).—Height 32 inches, thick; leaf-stalk of medium thickness, ribs very prominent; heart solid, distorted; flesh brittle; flavour good; many suckers. Slow to blanch. A good stock.

PRIZE WHITE (Clucas).—Very similar to 'Darragh's White,' with no suckers and hearts less distorted; sticks longer, 36 inches. A good stock. Raised by sender.

PRIZE WHITE (Cullen).—Height 38 inches, thick; leaf-stalks thick; heart open; flesh crisp; flavour good; a few suckers.

DEFIANCE WHITE (Apps), **H.C.**—Height 38 inches, thick; leaf-stalks of medium thickness; heart solid; flesh crisp; flavour good, strong. Stood well.

WRIGHT'S GIANT WHITE (Hurst).—Very similar to 'Defiance White,' but sticks irregular in size and flavour good, nutty. Raised by Mr. Wright.

COVENT GARDEN TALL WHITE (Barr).—Very similar to 'Wright's Giant White.' Stock contained 7 per cent. bolters.

MONARCH WHITE (Speed).—Very similar to 'Wright's Giant White,' except that the flesh is soft with a poor flavour; hearts distorted.

GIANT WHITE (Webb).—A poor stock with 8 per cent. bolting. Raised by sender.

INVINCIBLE WHITE (Dobbie).—Height 36 inches, thick; leaf-stalks of medium thickness; heart solid; flesh soft; flavour poor. Raised by sender.

Pink Varieties.

Both inner and outer leaf-stalks pink.

Early.

WARWICK DWARF PINK (Clucas).—Height 26 inches, thick; foliage abundant somewhat curled; leaf-stalk thick, broad; heart solid; flesh soft; flavour poor.

EARLY ROSE (W. H. Simpson).—Height 36 inches, thick; leaf-stalks thick, pale pink at the base; heart solid; flesh crisp; flavour good, nutty. Stands well.

CHAMPION PINK (Finney).—Height 30 inches, of medium thickness; leaf-stalk of medium thickness, pink at the base; heart solid; flesh crisp; flavour good.

FAVOURITE PINK (Dobbie).—Height 30 inches, thick; leaf-stalk thick, broad, deep pink; heart solid; flesh soft; flavour poor. Raised by sender.

PRIZE PINK (Dickson & Robinson).—Height 32 inches, thick; leaf-stalk of medium thickness, tinged pale pink at the base; heart solid; flesh crisp; flavour good; many suckers. Irregular in vigour of individual plants. No. 2 selection a darker pink but variable in colour. Raised by senders.

PRIZE PINK (Clucas).—Very much like the last, except that the base of the leaf-stalks is darker pink. Raised by sender.

Later.

AWARDS.

Clayworth Pink, A.M. November 19, 1931. Sent by Messrs. Nutting.

Stamford Park Pink, H.C. November 19, 1931. Raised and sent by Mr. Allan Falconer, Stamford Park, Stalybridge.

IDEAL (Stuart & Mein).—Height 28 inches, thick; foliage spreading; leaf-stalks thick, broad, deep pink; heart solid; flesh crisp; flavour nutty. Raised by sender.

HESFORD'S PINK (Clucas).—Height 30 inches, thick; leaf-stalks of medium thickness, very pale pink; heart solid; flesh somewhat stringy; flavour poor; blanching readily.

HYBRID PERFECTION PINK (Clucas).—Height 32 inches, thick; leaf-stalks of medium thickness, pink at the base; heart somewhat solid; flesh crisp; flavour good. Raised by Mr. Gabbot.

CLAYWORTH PINK (Nutting), **A.M.**—Height 36 inches, thick; leaf-stalks of medium thickness, dark pink at the base; heart very solid; flesh crisp; flavour good, nutty. Stands well. A very good even stock.

CLAYWORTH PRIZE PINK (Morris, Hurst).—Like the last, but less regular stocks.

CLAYWORTH PRIZE PINK (Apps, Watkins & Simpson).—Very similar to 'Clayworth Pink,' but foliage more abundant and leaf-stalks of a paler pink.

STAMFORD PARK PINK (Falconer), **H.C.**—Height 36 inches, thick; leaf-stalks thick, broad, pale pink at base; heart very solid; flesh crisp; flavour very good, nutty. Stands well.

PRESTON PINK (Clucas).—Height 32 inches, thick; leaf-stalks thick, very broad, blush-pink; heart solid; flesh crisp; flavour good; blanching readily; stands well. Raised by Mr. Gabbot.

CHAMPION PINK (Finney).—Very similar to 'Preston Pink,' but dwarfer, 28 inches, sticks thinner and of a deeper pink. Raised by sender.

LEICESTER PINK (Harrison).—Very similar to 'Preston Pink,' but leaf-stalks narrower and of a deeper pink; does not blanch so readily. Stands well.

WINTER PINK (Clucas).—Height 32 inches, of medium thickness; leaf-stalks of medium thickness, pink; heart solid; flesh crisp; flavour good, nutty. Stands very well. Raised by sender.

PRIZE PINK (Cullen, Brown).—Very similar to 'Winter Pink,' but does not stand so well. The first stock contained white rogues.

EXHIBITION PINK (Harrison).—Height 30 inches, thick; leaf-stalk thick; pink at base; heart solid; flesh crisp; flavour good, stronger than most. Stands well.

PINK BEAUTY (Speed).—Height 34 inches, thick; leaf-stalk of medium thickness, pink at base; heart solid; flesh soft; flavour fair. Raised by sender.

LATE PINK (Dickson & Robinson).—Height 30 inches, of medium thickness; leaf-stalk thick, pink; heart solid; flesh brittle; flavour good. Raised by senders.

SOLID GIANT PINK (Kelway).—Very similar to 'Late Pink,' but with more foliage and leaf-stalks paler; suckers few.

Red Varieties.

Both inner and outer leaf-stalks red.

Early.

AWARD.

Prize Red, A.M. November 19, 1931. Sent by Messrs. Nutting.

A1 DWARF RED (Hurst).—Height 22 inches, very thick; leaf-stalks thick, broad; heart very solid; flesh crisp; flavour very good, nutty. Variable in thickness of sticks. Stands well. Introduced by Messrs. Sutton. The red counterpart of 'Dwarf White Gem.'

PRIZE RED (Nutting), **A.M.**—Like 'A1 Dwarf Red.' A very good even stock.

Later.

AWARDS.

Wright's Giant Red, A.M. November 19, 1931. Raised by Mr. Wright and sent by Messrs. Hurst, Houndsditch, London.

Wright's Grove Red, H.C. November 19, 1931. Raised by Mr. Wright and sent by Messrs. Morris, Birmingham.

TIVEY'S LATE RED (Clucas).—Height 26 inches, thick; foliage abundant, spreading; leaf-stalks thick, broad, pale red; heart solid; flesh crisp; flavour good; stands well; many suckers. Raised by Mr. Tivey.

SOLID RED (W. H. Simpson, Speed).—Height 34 inches, of medium thickness; foliage abundant; leaf-stalks thick, pale red; heart solid; flesh crisp; flavour good; suckers few. Stands well.

GIANT SOLID RED (Kelway).—Very similar to 'Solid Red,' but leaf-stalks paler and broader and whole stick blanches more readily.

RED SELECTED (Dobbie).—Very similar to 'Solid Red,' but sticks thicker.

STANDARD BEARER (Benary).—Very similar to 'Solid Red,' but leaf-stalks broader and sticks thicker.

COVENT GARDEN TALL RED (Barr).—Very similar to 'Standard Bearer.'

PRIZE RED (Cullen).—Very similar to 'Standard Bearer,' but sticks narrower and flesh soft; many suckers.

LEICESTER RED (Morris).—Height 36 inches, thick; leaf-stalk thick; heart solid; flesh crisp; flavour good; stands well.

WRIGHT'S GIANT RED (Hurst), **A.M.**—Height 34 inches, thick; leaf-stalk thick; heart very solid; flesh crisp; flavour excellent, nutty; stands well. A very good even stock.

MAMMOTH RED (Webb).—Similar to 'Wright's Giant Red,' but irregular.

WRIGHT'S GROVE RED (Morris), **H.C.**—Very similar to 'Wright's Giant Red,' but with much and heavier foliage.

PINK BEAUTY (Johnson).—Height 34 inches, thick; leaf stalks of medium thickness, deep red; hearts very solid; flesh crisp; flavour good, nutty. Stands well.

PERFECTION PINK (Webb).—Height 30 inches, thick; leaf-stalks of medium thickness, red at base to middle; hearts solid; flesh crisp; flavour good, nutty.

SHALLOTS TRIED AT WISLEY, 1931.

A TRIAL of Shallots was made at Wisley in 1931, twelve stocks from various sources being grown in the Vegetable Trial Ground. Forty bulbs of each variety were planted on February 22, 9 inches apart in the rows, and they were judged when ready on July 13, 1931. The awards recommended by the Judges are shown below.

Reference to the report will show that not all the forms known as Shallots were represented, preference being shown by the senders for the larger-bulbed forms. The varieties with yellow skins are grouped together, and the red varieties—selections from the Jersey or Russian Shallot—by themselves. One form was allied to the potato onion.

AWARDS, DESCRIPTIONS, AND NOTES.

A. Yellow Varieties.

Bulbs round.

YELLOW SKIN (Morris).—Bulb small, averaging ⅜ oz.; solid; outer skin straw-coloured, inner white. 60 per cent. bolting. Crop 13 lb. 5 oz.

YELLOW (Poulet).—Much like the last, but bulbs flatter and somewhat larger, averaging ½ oz.; outer skin darker. 100 per cent. bolting. Crop 17 lb.

YELLOW (G. van der Veld).—Bulb of medium size, averaging ⅖ oz.; solid; outer skin straw-coloured, inner white. 12 per cent. bolting. Crop 17 lb. 9 oz.

LONGKEEPER (Stark).—Bulb large, averaging ⅘ oz.; solid; outer skin straw-coloured, inner creamy-white. 20 per cent. bolting. Crop 21 lb.

B. Brown Varieties.

Bulbs globe-shaped.

CHALMERS (White).—Bulb large, averaging 1½ oz.; solid; outer skin brown, inner white tinged purple. 5 per cent. bolting. Crop 19 lb. A potato onion.

C. Red Varieties.

AWARDS.

Red Skin, H.C. July 13, 1931. Sent by Messrs. R. A. Morris of Birmingham.

Red Selected, H.C. July 13, 1931. Introduced and sent by Mr. Luther R. Richards of Middleton, St. George, Co. Durham.

Giant Exhibition Red, H.C. July 13, 1931. Sent by Messrs. W. H. Simpson, Monument Road, Birmingham.

Bulbs round.

RED SKIN (Morris), **H.C.**—Bulb of medium size, averaging ½ oz.; very solid; outer skin brown tinged purple, inner white tinged red, especially so near the base. 2 per cent. bolting. Crop 16 lb.

RED (W. H. Simpson).—Like the last, but bulbs less solid and the inner skin paler. Crop 14 lb.

EXHIBITION (R. Veitch).—Bulb very small, averaging ¼ oz.; solid; outer skin reddish-straw, inner white tinged pale purple. 5 per cent. bolting. Crop 13¾ lb.

RED SELECTED (Richards), **H.C.**—Bulb of medium size, averaging ½ oz.; very solid; outer skin brownish-red, inner whitish-purple. 2 per cent. bolting. Crop 18 lb.

GIANT EXHIBITION RED (W. H. Simpson), **H.C.**—Characters of 'Red Selected' except that the outer skin is paler and the inner white faintly tinged with purple. No bolters. Crop 16 lb.

ENGLISH RED (Daniels Bros.).—Bulb of medium size, averaging ½ oz.; solid; outer skin brownish-red, inner whitish-purple. 10 per cent. bolting. Crop 12 lb. 10 oz.

LARGE RED EXHIBITION (Stuart & Miller).—Bulb large, averaging ½ oz.; solid; outer skin deep brownish-red, inner white much tinged with purple. 5 per cent. bolting. Crop 18 lb. 12 oz.

PARSNIPS AT WISLEY, 1931.

FORTY-NINE stocks of parsnips were sent for trial at Wisley in 1931, and all germinated well and made good growth. They were inspected on several occasions and judgment finally passed on November 19.

The seed was sown on March 14 in rows 18 inches apart, and the plants were thinned to 10 inches apart in the rows. The stocks contained very few bolters, but those from American seed showed much canker at the time of maturity, stocks from British sources being very free from this trouble.

AWARDS, DESCRIPTIONS, AND NOTES.

Roots flat-round.

ROUND (Z. v. Nunhem).—Roots 4 to 6 inches diameter; much core; 50 per cent. out of the soil. Germination poor. Foliage small.

Roots twice as long as wide.

BEST OF ALL (Heinemann).—Roots 4 inches diameter; very much core; 25 per cent. out of the soil. Many small roots.

INTERMEDIATE SELECTED (Hurst).—Very similar to 'Best of All' but roots more refined. A good even stock.

EARLY INTERMEDIATE (Barr).—Like 'Intermediate selected.'

SHORT THICK (Ferry-Morse).—Smaller roots than 'Best of All.' Variable in shape and size. Much canker.

Roots tapering, wide shoulder.

AWARDS.

Offenham, A.M. November 19, 1931. Sent by Messrs. Watkins & Simpson, Drury Lane, Covent Garden, W.C.

Magnum Bonum, A.M. November 19, 1931. Introduced and sent by Messrs. Harrison, Leicester.

Intermediate or Offenham, H.C. November 19, 1931. Sent by Messrs. J. L. Clucas, Ormskirk.

Intermediate, H.C. November 19, 1931. Sent by Messrs. Harrison, Leicester.

Early Evesham, H.C. November 19, 1931. Raised and sent by Messrs. Speed, Evesham.

OFFENHAM (Watkins & Simpson), **A.M.**—Roots 3½ to 4½ inches wide, 12 inches long, regular, clean; little core; neck hollow. A very good, even stock.

OFFENHAM (Hurst).—Like the last but variable in size and shape; 2 bolting.

OFFENHAM (W. H. Simpson, Apps, Nutting).—Longer, shoulder narrower than the last. Stocks variable in shape.

INTERMEDIATE OR OFFENHAM (Clucas), **H.C.**—Very similar to Messrs. Watkins & Simpson's stock of 'Offenham,' but less regular and longer.

INTERMEDIATE (Harrison), **H.C.**—A wider-shouldered and shorter root than the last.

EARLY EVESHAM (Speed), **H.C.**—Roots 4 inches wide, 12 to 15 inches long; neck hollow; skin paler than 'Offenham'; medium core.

EVESHAM (Harrison, Yates).—Less regular stocks of 'Early Evesham.'

MAGNUM BONUM (Harrison), **A.M.**—Very similar to 'Early Evesham' but roots larger with a deeper neck. A very good even stock.

STUMP ROOTED (Harrison).—An irregular stock with very many very small roots.

HALF LONG (Z. v. Nunhem).—Of 'Evesham' type.

Roots long, tapering.

AWARDS.

Marrow Improved, A.M. November 19, 1931. Sent by Messrs. Watkins & Simpson.

Student, A.M. November 19, 1931. Sent by Messrs. Morris, Birmingham.

Lisbonnais, H.C. November 19, 1931. Sent by Messrs. Hurst, Houndsditch, London.

HOLLOW CROWN (Johnson, Kelway, Speed).—Roots 3 inches wide, 18 to 22 inches long; neck somewhat hollow; irregular; medium core. Stocks variable in shape; the second had roots with many secondary roots.

HOLLOW CROWN (Ferry Morse).—Like the last. Four stocks sent and all were badly attacked with canker.

HOLLOW CROWN, THICK SHOULDER (Ferry Morse).—Like 'Hollow Crown' but a somewhat wider shoulder; variable in shape. Much canker.

MARROW IMPROVED (Watkins & Simpson), **A.M.**—Roots 3 inches wide, 18 to 24 inches long; neck very deeply sunk; little core. A very good even stock.

MARROW IMPROVED (Kelway).—An irregular stock; roots with many side roots.

NEW WHITE MARROW (Barr).—A variable stock; roots with few side roots.

MARROWFAT (Webb).—Variable in shape; roots with few side roots.

MARROW (Johnson).—Roots 3½ to 4½ inches wide, 18 to 22 inches long; neck hollow; core medium; skin pale. Variable in shape.

HOLLOW CROWN IMPROVED (Barr).—Roots 2 to 3 inches wide, 18 inches long; neck somewhat hollow; medium core; many side roots. Very variable in size and shape.

LISBONNAIS (Hurst), **H.C.**—Roots 3 inches wide, 18 to 22 inches long, almost cylindrical, regular; little core. A good even stock.

LISBONNAIS (Clucas, Speed, Kelway, Watkins & Simpson, Nutting).—Like the last but less regular stocks. The second and third stocks had many side roots.

ELCOMBE'S (Nutting).—Very similar to 'Lisbonnais.'

STUDENT (Morris), **A.M.**—Roots 3 inches wide, 18 to 24 inches long, almost cylindrical, clean and regular; medium core. A very good even stock.

STUDENT (Barr, Kelway).—Less regular stocks of the last.

STUDENT (Webb).—A mixed stock with intermediate rogues and roots with many side roots.

HOLLOW CROWN IMPROVED (Morris).—Like 'Student.'

SELECTED (Dobbie, Hurst).—Very similar to 'Student' but somewhat irregular.

SELECTED EXHIBITION (J. C. Wheeler).—Of 'Student' type but roots with very many side roots.

PRIZEWINNER (W. H. Simpson).—Of 'Student' type, but somewhat irregular.

SELECT (Mackey).—Near 'Student' type, but somewhat broader shoulder.

BOOK REVIEWS.

"American Alpines in the Garden." By A. McCully.

The cultivation of mountain plants has not yet seized the imagination of North American gardening amateurs as it has that of Englishmen, but there are signs that Americans are beginning to appreciate the delights of rock-gardening, as it is called. Mr. McCully's book should do much to foster an appreciation of North American plants by North Americans, whose flora has hitherto excited more interest, perhaps, among foreigners than at home. It is written by a man who knows his plants and knows how they should be managed by Americans, for whom it is intended.

"The Book of the Tree." Ed. by Georgina Mase. xliv + 239 pp. 8vo. (Peter Davies, London, 1927.) 5*s*. net.

The first part of this book is an introduction by the editor to the second—an anthology of trees.

To review such a book as this adequately would need a great space, and we can best recommend all those who love trees, the greatest ornaments of our country, and who like to read in their own speech the ideas of writers of the past, to obtain the book and read it. They will not regret it, and we venture to prophesy that they will often have it in their hand.

"What shall I do with my Garden?" By H. D. Sedgwick. 8vo. xii + 116 pp. (W. H. & L. Collingridge Ltd., London.) Price 5*s*. net.

This is a book of plans for small gardens with brief descriptions and hints as to their planning, and as such it will, we think, appeal to a large number of people who wish to lay out their own gardens in a way that will give them the most pleasure or be most profitable to them, for both pleasure and profitable use are considered by the author.

One of these plans shows her own garden, so that the author is talking about something that she has actually done for her own pleasure, and while quite probably no plan that she gives will precisely fit the conditions and wishes that the maker of a new garden has to meet, the book is full of useful hints and good ideas as to the preparation and methods of making various parts of the garden, as well as suggestions concerning the plants that can be used to furnish it.

Not the least useful part are the illustrations of bad work, for by noting what is bad, one knows what to avoid.

In one or two instances we could wish that a little warning had been given concerning the drawbacks of some of the things suggested. Edgings of paths, for instance, are too often harbours for slugs and snails, and a word as to the choice of edging where these pests are abundant would have been helpful.

Perhaps too little has been said with regard to hedges or fences, and when the next edition of this useful little book is published, we hope to see rather more regarding this important part of a small garden.

"Diary of a Scotch Gardener." By Thomas Blaikie. Ed. by Francis Birrell. 8vo. xii + 256 pp. (G. Routledge & Sons, Ltd., London, 1931.) Price 10*s*. 6*d*.

Thomas Blaikie, a young Scotsman, was sent out to Switzerland by Dr. Fothergill and Dr. Pitcairn in 1775 to collect alpine plants for their gardens, and this is the diary of his journeys and experiences, copied without change of spelling—and much of Blaikie's spelling, especially of place names, is phonetic—and without correction of grammar. The Diary is therefore not only interesting as a record of the conditions in which journeys had to be made in the days in which it was written, and of the difficulties of dealing with plants that were collected, and indeed of dealing with the natives of the district in which they grew at times, but it is also, in many instances, quite amusing.

Blaikie eventually settled in France, and became one of the most prominent of landscape gardeners there, in the days when the English garden was regarded as the height of artistic achievement. He had a finger in the making of the

plans of very many of the most celebrated gardens around Paris, and worked a great deal with the noted French architect, F. J. Belanger. Of the making of these gardens, of the difficulty he often had to obtain payment, of the troubled times that France was going through during his life there, of the many people of eminence he met, and his frequently expressed contempt for the work of other landscape gardeners, the latter part of the book has much to say.

We have a picture of a very energetic, very capable, very opinionated, but withal a very likeable character, portrayed by himself in his own expressive diction.

Altogether, it is one of the most interesting Diaries that we have read at any time, and it is not only interesting, but of value in indicating the introduction of many plants to this country, in showing the great part that English nurserymen and English gardeners played in the making of the great French gardens, in showing the habits of people of all degrees in France at the time, and in showing the development of many of the large gardens around Paris.

It is a book we can heartily recommend for its historical value, and as one to take up and read with pleasure at any time, whether one is particularly interested in gardens and garden-making or not.

"The Grey Squirrel." By A. D. Middleton. 8vo. viii + 107 pp. (Sidgwick & Jackson, London, 1931.) 4*s*. 6*d*. net.

Mr. Middleton has made a very considerable study of the habits of the grey squirrel in this country, and has consulted a large number of people as to the damage it does, and on all sides he finds condemnation of it.

That the grey squirrel is amusing to watch goes without saying, but unfortunately the harm it does to a very large number of plants puts it among the worst pests to which the English garden and wood are exposed. It will even take peaches from the fruit wall; it will eat the bark of such trees as the Sycamore; it will take nestlings and destroy them; and indeed there seems to be very little in the way of evil that it is not capable of, and apparently it works to its full capacity.

All this is set out quite clearly in the book of which we have just given the title.

The conclusion is that grey squirrels ought to be exterminated, and although there is no royal road to this desirable end, the author makes certain suggestions, and figures the trap which has been devised under the auspices of the National Anti-Grey Squirrel Campaign, which is reported to be very effective.

He refers to an extraordinary reduction in numbers which occurred in the winter and spring of 1930–31, through some sort of disease, but it seems clear, and indeed a note in one part of the book makes a definite statement, that the numbers are rapidly being replaced.

It is to be hoped that concerted action will be taken by all land owners and occupiers to reduce this menace to agriculture and horticulture, and to restrict the grey squirrel to cages.

We can commend the book as a fair statement of the present position of the grey squirrel problem.

"Our Native Cacti." By Ethel Bailey Higgins. viii + 170. (A. T. De La Mare Company, New York, 1931.) $2.50.

"Native" of course means American, for the true Cacti are almost restricted to America, although in popular parlance many plants of a succulent nature from various other parts of the world are included under this general name.

This little book, however, deals only with the true Cacti. It describes a very large number of species, tells how they may be grown and how, in places favourable to their cultivation outdoors, a Cactus garden may be made. That, we fear, is an impossibility outdoors in England, for very few Cacti have any pretensions to hardiness, but the greatly increased interest in the cultivation of Cacti in this country during the past few years will make this book sought for, and those who obtain it will not be disappointed.

There are a few pictures in colour, and some excellent illustrations from photographs in black and white, both of individual plants and of gardens where the Cacti are being grown.

From pp. 137–158, 101 questions and answers are given, some of which help to clear up the points left rather vague in the body of the book. Pp. 159–166 contain a list of Cacti native to the United States with their distribution there. Cacti, of course, spread southwards through Mexico and Central America into South America, so that this list, long as it is, is by no manner of means

exhaustive. There are one or two also in British Columbia, and one or two in Madagascar.

Care has been taken with the spelling of rather unfamiliar names, which have been devised since the old genera have been cut up into smaller groups, and the proof reading has been very well done.

Only one complaint we have, and that is that the compiler has not followed the rules regarding the capitalization of initials of specific names derived from the names of persons. Probably she expected that the Cambridge Convention would have adopted the lower case initial, but unfortunately that was not done.

" A Text Book of Agricultural Entomology." By Kenneth M. Smith. xiii + 285 pp., 79 figs. (Cambridge University Press, 1931.) 12*s.* 6*d.* net.

This book is intended to replace Curtis's " Farm Insects " (1860), which has been for many years the standard work on English agricultural entomology, but is now out of date owing to the advances in biological science and agricultural practice.

This work is devoted entirely to the insect pests of agricultural crops and farm stock, and the author has adhered rigidly to the class ' Insecta,' though the omission of any reference to other pests, for instance nematodes, slugs and snails, woodlice, millepedes, and mites, which are frequently but incorrectly classed as insect pests, will cause a certain amount of disappointment.

There are three introductory chapters. Chapter I describes the organization of agricultural entomology in England and Wales and refers to the work of the Phytopathological Service. Chapter II deals with the methods of insect control and their application to farming practice. Chapter III discusses the effect of weather conditions on insect outbreaks.

The chief insect pests of crops and stock are reviewed in Chapters IV–XIII. The eight Orders of Agricultural importance in the British Isles include the *Collembola* (springtails), *Anopleura* (biting and sucking lice), *Thysanoptera* (thrips), *Hemiptera* (plant bugs, aphides, etc.), *Lepidoptera* (butterflies and moths), *Coleoptera* (beetles and weevils), *Hymenoptera* (sawflies, ants, bees, and wasps), and *Diptera* (two-winged or true flies). Detailed descriptions are given of each pest in the adult stage, host plants, injury to host plants, symptoms of attack, distribution, control, and natural enemies. The lists of parasites form a refreshingly new feature in a work of this kind and are very complete. A guide to the literature dealing with the several pests is given at the end of each chapter.

The last Chapter (XIV) deals with Virus Diseases and their transmission by insects, and no one is more fitted to explain this subject than the author, who is a recognized authority.

There are two useful Appendices. Appendix I gives in tabular form a host-plant list with symptoms of attack and the insects responsible for the particular damage. This method of presentation will be welcomed by the non-technical reader, who is enabled thereby to diagnose the trouble with which his plants are affected.

Appendix II is devoted to the relationship between insect pests of cultivated crops and weed hosts, and the importance of wild food plants in farm practice is clearly shown by the number of insect species which are able to carry over from one season to another on weeds growing in headlands, hedge banks, and waste ground.

The three Indexes—Authors, Parasites and Predators arranged under their Natural Orders, and General—are very complete and make a fitting termination to an excellent textbook.

The information throughout is up to date, and the book is remarkably free from errors and misprints. There is little criticism that can be levelled against this book, with the exception of the rather heavy and unnecessary regard to detail in the descriptions of the several species. The general reader is not *au fait* with entomological terms, and some of the descriptions are such that even a student of entomology would be inclined to become over confident and make the description fit his particular specimen. The absence of generic and specific keys is to be deplored. The persistence with which one finds the characters of the mandibles of chafer larvæ (pp. 96 and 98–100) stressed is remarkable, since those of the anal segment of the several species are easier of recognition.

The author is to be congratulated on the general arrangement of the book and the care with which it has been compiled. This book will serve the farmer, the agricultural student, the adviser, and the entomologist with a textbook that is thoroughly reliable in its information, while the illustrations—some of which are original—are clear and correct in detail. The price is distinctly reasonable, a feature too rare in modern textbooks.

" International Address Book of Botanists." By Prof. Dr. L. Diels, Dr. E. D. Merrill, and Dr. T. F. Chipp. 8vo. xv + 605 pp. (Baillière, Tindall and Cox, London, 1931.) Price 12*s.* 6*d.*

At the International Botanical Congress held at Cambridge in 1930, a committee was appointed to arrange for the publication of an address book of botanists. It has just appeared, and it contains the names and addresses of botanists in practically all countries of the world, arranged alphabetically under their countries, with an index so that each can be easily found. There is, in addition, as an introduction to the list of names in each country, a list of societies and institutions interested in botanical work, and in most instances an indication of the responsible head.

The whole of this work appears to have been done with the utmost care, and it cannot fail to be of the greatest possible value to all whose work in any way necessitates reference to botanists in different parts of the world.

" The Scented Garden." By Eleanour Sinclair Rohde. 8vo. 312 pp. (The Medici Society, London, 1931.) 10*s.* 6*d.* net.

In this recently published book Miss Rohde has added one more series of essays reflecting her love of the older literature of gardening as well as her appreciation of the living garden plants of to-day. It is obvious that her information has been culled from a very wide range of reading; and in many cases one feels that references to her sources would have added to the usefulness of the book. In the volume now under consideration, the emphasis is naturally laid upon the appreciation and cultivation of plants yielding scents; and four plant lists at the end of the book give a good deal of useful information in a small compass. One point of much general interest is referred to—that of the nostalgia produced by certain scents, such as new-mown hay, honeysuckle, violets, etc. Memories associated with some such scents appear to have a very lasting effect upon the human mind, and it would be interesting to know exactly why that is so. Again, Miss Rohde devotes several pages to matters of autobiographical interest.

Like so many books written by the happy enthusiast, a certain number of errors of various kinds are to be found in the text. To cite two instances: on p. 91, Adrian van Rozen should be Adrian van Roijen; on p. 11, footnote, the Latin book title lacks the nominative, " Historia."

Chapter VIII is entitled " Sweet Bag, Pot-pourri and other Recipes," and some of these, collected from various stated sources, are of much interest. On p. 188 reference is made to the addition of *Linnaea borealis* to the British Flora, by Professor James Beattie of Aberdeen. It may be of interest to state that the painting of the plant sent by Beattie to the Linnean Society is still preserved in its archives.

This book is well produced by The Medici Society, and is in every way a pleasant addition to its peculiar type of gardening literature.

" The Gardener's Year." By Karel Capek, illustrated by Josef Capek. 8vo. 160 pp. (George Allen & Unwin, Ltd., London, 1931.) 3*s.* 6*d.* net.

We have received a copy of " The Gardener's Year " by Carel Capek with illustrations by Josef Capek, the well-known authors of " R.U.R." and " The Insect Play." Gardening evidently presents the same problems in Czecho-Slovakia as it does in this country, and English amateur gardeners will read this useful manual with sympathy, appreciation, and gratitude.

The wealth of accurate information which it contains can only be the outcome of much practical experience on the part of the distinguished author, and herein, undoubtedly, will be found the secret of its appeal.

" School Botany." By Macgregor Skene. vii + 243 pp. 8vo. (Clarendon Press, Oxford, 1931.) 3*s.* 6*d.*

Dr. Skene's books are all marked by a freshness of outlook, and this is no exception. He entitles it " School Botany," but it is a book that we may take up and read as well as one that may be used as a class-book. It is well illustrated by clear line drawings, which have, so far as we can see, never been used before.

Suggestions for experiments are included here and there in the text, and these appear to be such as are within the power of ordinary students to perform with ease, and they certainly illustrate the main facts of plant physiology.

A particularly useful feature is contained in the last chapter, where a simple account of plant communities is given. An appendix gives a list of the simple apparatus required to carry out the experiments.

"Leaves from Gerard's Herball, arranged for Garden Lovers." By Marcus Woodward. xii + 305 pp. 8vo. (Gerald Howe, London, 1931.) 7*s.* 6*d.* net.

"Gerard's Herball" appeared in 1597. It contained a good many mistakes, which Thomas Johnson corrected in 1633. Since then it has been a book which all plant lovers have desired to possess, and to which they all have gone whenever they had an opportunity to read about plants that will grow in England, in language that is quaint but exact, and such as can be easily understood, although it deals so often with the form of plants. It deals not only with that but also with their properties, and many quaint remedies for various diseases are contained.

Marcus Woodward has now extracted some of the articles and gives them here in this little book, so that they may be available for everyone. He tells of bulbous Violets, which some call Snowdrops, of Daffodils and Sowbread, of the Windflower and Duck's-meat, of the Cresses and the Paper-reed, of the Mandrake and Henbane, and many other plants familiar to us to-day.

It is a book we can most heartily recommend for passing away a leisure hour now and again, and one from which we even now may learn a very great deal, and be at the same time charmed by its "well-flavoured English."

"The Soil." By Sir A. D. Hall. Ed. 4. ix + 388 pp. 8vo. (John Murray, London, 1931.) 9*s.* net.

This book first appeared in 1903, and has been revised and reprinted many times. It is therefore unnecessary to give a long notice of it, and sufficient to say that it is the best book on soils in the English language for the ordinary reader.

The author has taken the opportunity of bringing up to date the matters with which the book deals, and it is one that we can commend to anyone who has any interest in the cultivation of the soil.

"The Gardener's Thumb." By D. Fyfe Maxwell. viii + 144 pp. 8vo. (Sweet & Maxwell, London, 1931.) 4*s.* 6*d.* net.

"This collection of trifles is not intended to constitute a 'gardening book' within the meaning of the Act . . . rather have I tried to write a *gardener's* book."

Here the author tells us what we may expect to find, but do not suppose that the gardener will learn nothing of his craft if he reads it, for here and there he certainly will, and if he starts to read it we are sure that he will not be likely to put it down until he has finished it.

The author looks at the gardening world and gardens with a kindly eye, and he writes of what he sees, and of some of the visions conjured up in his mind, and it is all done in a very charming fashion.

We wish the book were a little longer!

"Everyday Gardening." By J. Coutts. 448 pp. 8vo. (Ward, Lock & Co., Ltd., London, 1931.) 7*s.* 6*d.* net.

There are large numbers of books which aim to deal fully with all phases of garden work, and this is one of them. It gives a calendar, treats of cultivation, garden planning, lawns and their maintenance, the making of a flower garden and the plants to put in it, of hedges, fences, and walls, and gardening under glass, of propagation, of the fruit and vegetable garden, and in addition gives an alphabetical list of flowering plants and trees and shrubs, with notes on their cultivation. There are useful lists of plants, with their usual time of flowering and so on, and the book is a monument to the industry of the compiler. We may also remark that it is very low-priced compared with many books of the present day.

On the whole, the lists of varieties of such things as Chrysanthemums, Dahlias, and Roses are good and up to date, although, of course, those who read the reports of the Society's trials will not need such aids as a book of this kind can give in that particular direction. The lists are not, however, to be followed without some inquiry. For instance, among shrubs we are told that *Ribes Grossularia* is ornamental. The author calls it a flowering gooseberry. It is, of course, a gooseberry, and like all other gooseberries flowers, but it can scarcely be called ornamental. The fruit is better to eat than to look at, and the flowers are insignificant. Possibly the author meant *Ribes aureum*.

Here and there we find careless slips of this kind, which detract from what otherwise might be a good guide for the beginner.

We do not find the recommendations with regard to varieties of fruit are quite so up to date as are the lists of flowers. The Apple 'Laxton's Superb,' for instance, might well have been included, and the Red Currant 'Laxton's Perfection' or 'Laxton's No. 1,' the Blacks 'Seabrook's' and 'Daniel's September,' and the Gooseberries 'Leveller' and 'Whinham's Industry': all good things.

Even allowing for such drawbacks as these, the author still has given us a book containing an immense amount of useful information.

"Perpetual Carnations: a Handbook to their cultivation." By L. J. Cook. 8vo. 104 pp. (Benn, London, 1931.) 3*s*. 6*d*. net, paper boards.

The perpetual-flowering carnation is often grown by amateurs but too often with only mediocre results. Here we have a guide to all phases of its cultivation, with wise notes telling clearly what to do and what to avoid. We should like, however, to have seen a full recipe for a fertilizer which could be mixed at home.

"Handbook of Coniferae, including Ginkgoaceae." By W. Dallimore and A. B. Jackson. Ed. 2. 8vo. xiv + 582 pp. (Arnold, London, 1931.) 42*s*. net.

This new edition gives, in addition to the matter in the first edition, the nomenclature up to date and an alphabetical list of species, hybrids, and varieties not mentioned in the former edition.

"Lawns: Garden Lawns, Tennis Courts, Croquet Grounds, etc." By Sutton & Sons. Ed. 14. 64 pp. 4to. (Simpkin Marshall, London, 1931.) 1*s*. 6*d*. paper boards.

A new edition of this well-known account of lawn making and maintenance.

"Gardening made Easy: the ABC of the Garden." By E. T. Cook. Ed. 9. v + 222 pp. 8vo. (Country Life, London, 1931.) 3*s*. 6*d*. net.

A book of proved usefulness dealing with the common operations called for in all gardens and with the plants commonly used to furnish them—a reliable book clearly written.

"An Introduction to Plant Physiology." By W. O. James. 8vo. 258 pp. 74 figs. (Clarendon Press, Oxford, 1931.) 7*s*. 6*d*.

This book has been designed to meet the requirements of senior scholars of the schools in which Biology is taught, and to serve as an introduction to the subject for first-year undergraduates reading Botany. At the outset we may say that the book admirably fulfills its function.

Nowadays the reader will possess a sufficient knowledge of chemistry to appreciate the earlier chapters, in which the author deals with the carbohydrates and the synthesis and oxidation of these compounds. The results of modern research are presented in simple terms; graphs and diagrams are freely used to illustrate the text. It is refreshing to find new and clear diagrams in an elementary text. Due acknowledgment is made where the graphs have been copied from original articles and papers, but no other references to the original works appear.

In dealing with such topics as respiration, where much of the fundamental work is comparatively recent, the author has, apparently, experienced some obstacles in the way of maintaining the even standard of the text. Succeeding paragraphs vary greatly in the difficulties they present to beginners. For example, on one page the respiration of succulents and fatty seeds is briefly dealt with, on the succeeding page a few simple observations on the respiration of animals and plants occur. Such general observations might well fall into the introductory paragraphs of the chapter.

The chapter dealing with protoplasm contains a simple account of the physical properties of sols, gels, and colloids generally, and is followed by a brief description of enzymes; both are good.

In dealing with mineral nutrition the author has refrained from pointing out the practical application in the field and garden of such consideration, and makes little or no mention of artificial manures and fertilizers. The water relationships of soils and the entry of the elements into the plant are dealt with. He follows closely Maximov's classification of plants into drought evaders and drought endurers, etc., when discussing transpiration and drought resistance.

Experiments to be performed by the students are briefly outlined at the end of each chapter. These can be performed with ordinary small apparatus available in every laboratory.

On page 246 we read that seedling hollyhocks appear to be more resistant to rust than are plants raised from cuttings. There is little evidence for such a statement that will bear critical examination. No other such errors have been detected, and the text is particularly free from misprints, etc. Perhaps the systematist may wonder why the trivial name of *Hypericum calycinum* sometimes boasts a capital (p. 19) and other times does not (p. 16); and perhaps the purist may not embrace the expression "heaps up" for accumulates or "destarch" for removal of starch, but these are minor points.

"The Coconut." By Edwin Bingham Copeland. 8vo. xviii + 233 pp. (Macmillan & Co., Ltd., London, 1931.) 20*s*.

The first edition of this book appeared in 1914, and now a third edition has been called for, and the author has taken the opportunity of bringing all the information that the book contains into line with present-day practice. He deals with the selection of seeds, the raising of seedlings, the cultivation of the trees in the field, the diseases and pests that attack them, the physiology of the plant, the climate and soils that suit it best, and finally with the products obtained from it.

The book is therefore a very comprehensive one, and it is based upon the author's experience in the Philippines and the work that has been done in various other parts of the world where the coconut is an important plant.

Coconut cultivation has increased in the last 20 or 30 years very much, but there is still room for improvement in the way of increased crop and better cultivation, and there is no reason to suppose that the use of coconut products will be likely to diminish in future. One of these products alone, Coconut Oil, seems to be still steadily increasing in demand.

The book is one that all those in any way concerned with coconut growing would do well to make themselves familiar with.

A very commendable feature is the full index, which enables the book to be consulted with great ease.

"Plants and Animals." By Walford B. Johnson. 8vo. 192 pp. (Longmans, Green & Co., 1931.) 2*s*. 9*d*.

This little book is intended to show to even young people the main facts of plant and animal structure in relation to their environment, and illustrations of the way in which living things fit in with their surroundings are drawn from flowering plants and ferns, mammals, reptiles, birds, fishes, and insects, and in the main the illustrations given are such as can be easily seen without recourse to a microscope.

It is scarcely a book for very young children, for the author has not been at pains to choose the shortest words that might serve his purpose, but at the same time it is written in an interesting fashion, so that a boy of 14 or 15 would easily be able to understand anything that he reads in it.

"Easy Experiments with Plants." By Herbert McKay. 8vo. vi + 98 pp. (Oxford University Press, London, 1931.) 2*s*.

This book certainly lives up to its title, and it details a series of experiments within the compass of anyone with a little manipulative skill to perform with the minimum of apparatus. They are demonstrations that will work, and will not call for a great many explanations as to why they have failed to show what they are intended to show. They are therefore such as can be performed in elementary classes where it is desired to give the students an insight into the ways of life of plants, and as such we can commend the book.

"Sanders' Encyclopædia of Gardening." Revised by A. J. Macself. 8vo. xvii + 477 pp. (W. H. & L. Collingridge Ltd., London.)

This is a dictionary of cultivated plants, etc., giving in alphabetical sequence the cultivation and propagation of hardy and half-hardy plants, trees and shrubs, orchids, ferns, fruit, vegetables, hothouse and greenhouse plants, etc., including their specific and common names, and it has reached its 21st edition, being now revised by Mr. A. J. Macself.

That it has lived so long is very good evidence of its value, and the revision appears to have been done with care, and so as to include many of the plants that have reached Great Britain within the last few years. There is, for instance, a good list of the Primulas that have come from China, with notes on their colour and habit, and as these plants are arranged according to the position they themselves occupy in the garden, and careful details of cultivation in these positions are given, the gardener has at his hand a very ready means of suiting the plants that come to him. He cannot, of course, find everything about cultivation of plants in it. For instance, it might have been well to warn against the addition of lime to the soil for such a plant as *Gentiana sino-ornata* in a genus where many of the species are the better for a little broken limestone, but it would be impossible to include every little detail of this kind within the compass of such a book, which includes plants of all kinds in its pages.

"The Gardener's Chapbook." Edited by E. H. M. Cox. ix + 258 pp. (Chatto & Windus, London, 1932.) 7*s.* 6*d.* net.

This is an attractive little volume dealing with such subjects as Anthology, Herbs and Simples, Forgotten Plants, Perfumes and Potpourri, and Garden Proverbs, accompanied by reproductions of some rather rare illustrations. The extracts, in prose and verse, are from the personal collection of the editor, and selected by him on account of their apt and beauteous language. He has brought together a potpourri which will be of interest to many and which reveals his extensive knowledge of the literature of plants and gardens.

"Plant Life Through the Ages." By A. C. Seward, Sc.D., LL.D., F.R.S. xxi + 601 pp. (Cambridge University Press, 1931.) 30*s.* net.

Although horticulturists are concerned with the growing of plants as these are found in the world to-day, they cannot fail to be interested, unless devoid of all curiosity and imagination, in the previous distribution of the species they cultivate and in the pre-existing flora of the world.

The occurrence of fossil plants as well as animals has been known for many hundreds of years, and the labours of geologists have so elucidated the structure of the rocks that we have had, for upwards of a century, a fairly clear outline of our earth's geological history. Plant-remains are more difficult to unravel than those of animals and for some sixty or seventy years palæo-botanists have been patiently working in this field. Fragmentary though the remains be, the external structure of the different forms has been slowly pieced together, and by means of specially prepared microscope "sections" the minute structure of the tissues has been ascertained, thus permitting a system of classification. Fossil botany indeed has been largely a study of microscopic structure and plant-anatomy, and the small band of enthusiasts who have worked in this field are greatly to be admired for their laborious and highly specialized researches.

Being mainly concerned with extinct plants these investigations have often received but scant appreciation even from the botanist. So much, however, has now been ascertained that an account giving a survey of past floras for the interested non-specialist was highly desirable. No one was more fitted for the task than Professor A. C. Seward, distinguished not only for his researches in the whole realm of palæo-botany, but as the author of the four volumes entitled "Fossil Plants." In the last of these volumes he promised "a general review of the Floras of the Past." That promise, eagerly awaited, has been fulfilled in the work under notice.

A detailed review is not called for in the pages of this JOURNAL. The earlier chapters are of an introductory nature and deal chiefly with aspects of geology necessary to understand the main subject. These are followed by a series of chapters outlining the vegetation during successive periods. Passing by the Cambrian, Permian, Triassic and Jurassic, which were dominated by fern-like and other plants now long extinct, the horticulturist will find himself more at home in the chapter on the Cretaceous Period when Monocotyledons and Dicotyledons made their appearance (with an apparent suddenness which has never been explained) on the surface of the globe. He will read of such genera as *Laurus*, *Magnolia*, and *Platanus*, which persist to-day, as well as many others, such as Araucarities, allied to present-day genera but which have not survived. From the Cretaceous Period he will pass on to the account of the Tertiary, where all genera will be familiar friends, and he will finally reach Chapter XVII, dealing with the present period with its glacial epochs, post-glacial deposits, and the plant world as we see it to-day. In addition to the historic records of the various floras, the reader will encounter the interesting problems of past distribution of sea and land—so different from our own—and of remarkable changes in the earth's climate (as evidenced, for instance, by the occurrence of subtropical genera in Greenland during the Cretaceous period). An attractive feature is the series of ancient landscapes reconstructed by Professor Seward and illustrated by drawings by Mr. E. Vulliamy of King's College, Cambridge.

The volume exceeds expectations both from the purely botanical and from the general standpoint. By excluding as far as possible the technicalities of fossil-botany and plant-anatomy the author has succeeded in producing a singularly attractive treatise of the earth's past history and on its successive floras which, written in a lucid and stimulating style, impel the curious to pursue the story to the end. This is largely the result of the author's own enthusiasm and the wide reading which he has brought to bear on the subject. It is safe to predict that the book will be widely read and be read with pleasure and interest, and will do much to increase regard for fossil botany.

NOTES AND ABSTRACTS.

[For Index of Periodicals quoted see previous volumes.]

Biological Races and their Significance in Evolution. (*Ann. App. Biol.*, vol. xviii. No. 3, Aug. 1931, pp. 404–452).—A symposium dealing with intra-specific races of living organisms arranged under the following headings: I. Insects, by W. H. Thorpe; II. Nematodes, by T. Goodey; III. Fungi, by W. B. Brierley; IV. Bacteria, by P. Bruce White; and V. Seed-bearing Plants, by W. B. Turrill.

Three points are discussed by the several authors, viz: (i) Evidence of the existence of such races; (ii) their significance in relation to evolutionary problems; and (iii) their significance in relation to applied biology—the last factor being one of supreme importance to every cultivator of economic plants.

The ability of pathogenic organisms and phytophagous species of insects to change their food plant, and the economic consequences arising therefrom, are discussed in detail.—*G. F. W.*

Capsid Bugs. A Contribution to the Biology of the Apple Capsid, Plesiocoris rugicollis Fall., **and the Common Green Capsid, Lygus pabulinus** L. By M. D. Austin (*Jour. S.E. Agric. Coll., Wye*, 28, 1931, pp. 153–168; 8 figs.).—The economic importance of the apple and common green capsids is discussed in detail under the sectional headings: (*a*) nature and extent of injury to their several host plants; (*b*) bionomics; (*c*) descriptions and measurements of ovum, instars and adult; and (*d*) technical descriptions to facilitate the separation of the two species in their nymphal stages.—*G. F. W.*

Fruit Blossoms, Insect Visitors to. By C. H. Hooper (*Jour. S.E. Agric. Coll., Wye*, 28, 1931, pp. 211–215).—A summary of records made at Wye and Wisley of the chief insect pollinators of the flowers of hardy fruits. The pollinators are dealt with under their respective orders, viz.: Hymenoptera, Diptera, Coleoptera, Lepidoptera and others.

The value of Hive Bees and practical suggestions for their introduction into orchards during the period of blossoming are considered.—*G. F. W.*

Fruit Trees, Observations on Gall Midges affecting. By H. F. Barnes (*Jour. S.E. Agric. Coll., Wye*, 28, 1931, pp. 170–177; 4 figs.).—This paper deals with new and recent information concerning some of the principal gall midge pests of fruit, and serves to bring up to date the sections dealing with the same subject in a previous paper, viz.: "Monograph of the British Cecidomyidae" (see *R.H.S. Jour.*, **53**, p. 197).

The following species are considered: Leaf-Curling Pear Midge, *Dasyneura pyri* Bouché (distribution, life history, control, and natural enemies and parasites); Leaf-Curling Apple Midge, *D. mali* Kieffer (distribution); Pear Midge, *Contarinia pyrivora* Riley (life history, control, and natural enemies and parasites); Red Bud Borer of Rose, *Thomasiniana oculiperda* Rübs. (distribution, life history, oviposition by the midges when no grafts were available, possible change of host plant and control); and *Dasyneura sp.*, the Black Currant Midge (description of attack and identity of species and control).—*G. F. W.*

Loganberry Beetle, The. By W. Steer (*Ann. Rept. East Malling Res. Sta.*, April 1931, pp. 210–221; 2 figs.).—The adult beetle, *Byturus tomentosus* F., destroys the buds, while the larvæ cause the formation of small and deformed berries and infest the fruits of raspberry and loganberry.

The life history is briefly described.

The various mechanical and chemical control measures which have been recommended from time to time are discussed.

The greatest reduction of damage is attained by the use of arsenate of lead, but attention is drawn to the danger of using an arsenical preparation owing to the residue of arsenic on the fruits.

Promising results have been obtained by the use of a new extract of Pyrethrum and a proprietary Derris preparation.

A method of removing the larvæ from ripe fruits prior to their use for preserving has been devised by previously washing the fruit in a weak salt solution (about 4 ozs. of salt to a gallon of water). The infested fruits should be poured into the liquid in a large enamelled bowl and stirred. All the larvæ leave the fruits after an interval of 15 minutes and sink to the bottom, while badly damaged fruits float and may be skimmed off. The clean fruit should then be lifted out and dropped for a few minutes in clean water.—*G. F. W.*

Narcissus Bulb Flies, A New Method of Preventing Attacks of. By W. E. H. Hodson (*Jour. Min. Agric.*, viii. April 1931, pp. 54–60).—The species of Bulb Flies responsible for damage to Narcissus bulbs are the large Narcissus Fly, *Merodon equestris*, the Lesser Bulb Flies, *Eumerus tuberculatus* and *E. strigatus*, and, occasionally, *Syritta pipiens*.

Short descriptions of the life histories of the several species are given.

The mechanical methods employed for controlling these pests are not always completely effective under commercial conditions, the principal limiting factors being: (i) Seasonal uncertainty whereby the appearance of the flies is hastened by warm weather; (ii) susceptibility of varieties to attack, some varieties, *e.g.* 'White Lady,' appear to fall an easy prey every year; (iii) absence of general hygiene on the part of some growers, whose beds of Narcissi act as breeding-grounds; and (iv) the presence of either " escapes " or wild Narcissi, which constantly maintain a population of flies.

An effective method of destroying the adult flies has been devised by a method of baiting with a sweetened poison bait. The results of several experiments have shown that the most effective bait was a mixture of 4 oz. sodium fluoride, 1 lb. crude glycerine, 2 lb. white sugar, and 4 gallons of water. The spray remains effective upon the Lesser Bulb Flies for from 3 to 14 days, and upon the Large Bulb Fly for from 3 to 10 days, the length of time depending entirely upon weather conditions.

The material should be distributed over a wide area in the form of large drops, allowing 8 gallons for each acre of ground, with a minimum of four sprayings made during the season—*i.e.* the last week in May, mid-June, mid-July, and during the third week in August. Better results will follow if the applications are made during bright, warm weather.

The total cost of the four sprayings should not exceed £1 an acre.

G. F. W.

Potato Leaf-Roll, On the Transmission of, by Aphides. By T. Whitehead. (*Ann. App. Biol.*, vol. xviii, No. 3, Aug. 1931, pp. 299–304; 1 plate).—Results obtained during the winter of 1928–1929 suggested that *Myzus persicae* Sulz. was not the sole vector of potato leaf-roll. Field and laboratory experiments carried out during 1929 and 1930 resulted in abundant evidence being secured as to the efficiency of two other species of Aphides, viz.: *M. circumflexus* Buckton and *Macrosiphum gei* Koch., to transmit the disease. The latter species only transmitted the disease once and its importance as a field vector is still an open question.

Myzus circumflexus proved to be as efficient a vector as *M. persicae* though it has not been recorded on potatos in the field and is therefore unlikely to be of importance in spreading leaf-roll under these conditions. The ready identification of the apterous female makes it a valuable species to use in critical transmission work.

A retarding of the development of symptoms was observed in the case of *M. circumflexus*.—*G. F. W.*

Potato Sickness, Experiments on. By W. F. Cheal (*Ann. App. Biol.*, vol. xviii. No. 3, Aug. 1931, pp. 401–403; 1 plate).—A further series of pot experiments carried out in 1930 with potato eelworm, *Heterodera schachtii*, and the fungus *Corticium solani* and an additional species *Colletotrichum atromentarium* resulted in a definite effect, the first year of inoculation in those pots where *H. schachtii* was present.

The cause of potato sickness is a biological one, since the disease was checked by steam-sterilizing the affected soil.—*G. F. W.*

Pyrethrum, Extracts of: Permanence of Toxicity and Stability of Emulsions. By F. Tattersfield and R. P. Hobson (*Ann. App. Biol.*, vol. xviii. No. 2, May 1931, pp. 203–242).—Attempts have been made in recent years to prepare and employ extracts of pyrethrum rather than to rely on the less effective method of using

a finely ground powder for insecticidal purposes. The flowers, both as whole heads and as powder, retain their toxic properties at ordinary temperatures for a considerable time provided that they are stored in closed vessels. A loss occurs when they are exposed to the atmosphere in a thin layer.

The permanence of the active principles of alcohol, petroleum and water-miscible oil extracts is discussed. The toxicity of alcohol and petroleum extracts of pyrethrum is retained for many months in temperate climates.

The methods of determining quantitatively the relative stability of the emulsions are dealt with in detail.

Investigations were made as to the readiness with which water-miscible petroleum extracts disperse in the aequous phase and the stability of the emulsions formed under various conditions.—*G. F. W.*

Slugs, On the Ecology and Control of. By H. W. Miles, J. Wood and I. Thomas (*Ann. App. Biol.*, vol. xviii. No. 3, Aug. 1931, pp. 370–400).—An admirable treatise dealing with one of the most persistently injurious of the many pests which attack agricultural and horticultural crops. The paper is divided into two parts: (i) Ecology, and (ii) Experiments on the Control of Slugs.

Part I is divided into sections dealing with such aspects as Local Conditions (soils and climate); Slugs in Lancashire, Distribution of the various slug species, Life History studies of *Agriolimax agrestis* L., *Milax sowerbyi* Fér., and *Arion subfuscus* Drap., and Feeding Habits; Observations on the Factors determining slug prevalence, including natural factors influencing slug development—moisture, temperature, organic matter and soil reaction; Influence of Cultivation on slug prevalence—drainage, manuring and cropping; Slug movement and natural enemies, and Conclusions.

Part II is devoted to a review of control measures, arranged under four headings, viz.: (i) Introduction; (ii) Laboratory Experiments—tests with control substances, with lethal substances mixed with soil, and for repellent effects; (iii) Field Trials in 1928 and 1929—treatment of the soil before cropping, tests of repellents, and tests with Paris Green; and (iv) Discussion of Results.

The most important factors influencing the development of slugs are a soil with a high water-holding capacity and a soil where the use of organic manures and the development of intensive culture afford an abundant food supply.

The most satisfactory method of dealing with the slug pest in the north-west district of England appeared to be by the use of repellents, either Corrosive Sublimate (1–1000) or Creosote and Precipitated Chalk (1–100) according to the availability of the water supply. Any considerable relief in the number of slugs can only follow modification in the character of the soil, and this change in soil conditions may be produced by substituting artificial manures for organic dressings.—*G. F. W.*

Strawberry and Raspberry Bud Weevil, *Anthonomus rubi* Herbst., A Note on the. By S. G. Jary (*Jour. S.E. Agric. Coll., Wye*, 28, 1931, pp. 147–152; 5 figs.).—This weevil, known locally as "Elephant Fly," "Elephant Beetle," or "Needle Bug," is frequently a serious pest of both raspberries and strawberries in many parts of the country. An account of the habits and life history is given, the information being compiled from observations made in the Botley district of S. Hampshire during 1929 and 1930.

Descriptions of the several stages are given.

Adult weevils were commonly found on brambles and wild roses, though the larval stages have so far been found only on the wild strawberry.

No opportunity of trying out control measures has been afforded, but certain lines of attack suggest themselves as a result of field observations, viz.: (i) the use of poison sprays or dusts applied during the latter half of July and August prior to the period of hibernation, and in early May following the emergence of the weevils from hibernation; (ii) trapping is suggested, as the weevils show a marked tendency to seek out dry hibernation quarters during August—large numbers being found among the debris at the base of hawthorn hedges; and (iii) burning over the beds during July will account for a small proportion of adult weevils.—*G. F. W.*

Strawberry Pests in the Cheddar District, Carabid Beetles as. By C. L. Walton and H. G. H. Kearns (*Jour. Min. Agric.*, xxxviii. No. 4, July 1931, pp. 373–379; 12 figs.).—Investigations have been carried out over a period of three years, 1928–1930, to determine the species of Ground Beetles responsible for damaging Strawberry fruits and the type and degree of such damage, to investigate the life histories of injurious species, and to discover means of control.

Attacks by these beetles are frequently sporadic, and beds affected in one year may be free from attack during the following season.

The chief culprit is *Ophonus pubescens* (*Harpalus ruficornis*), here called the Strawberry Seed Beetle, and which, like *Abax ater*, removes and ingests the seed contents, thereby causing the berry to become soft and discoloured and to shrivel. *Pterostichus madidus* and *P. vulgaris* cause serious damage by eating holes in the flesh, the effect being similar to that of slugs and certain birds. The four species of beetles, together with the types of injury, are illustrated by excellent photographs.

These species are mainly nocturnal in their habits and dislike dry conditions in both the larval and adult stages. The greatest amount of damage is done in rows of strawberry plants near hedgerows and headlands during warm, damp periods.

The life histories of the several species are somewhat similar. They overwinter as both adults and larvæ, the former preferring hedge banks surrounding small fields—a typical feature of the Cheddar district.

Evidence as to the efficacy of traps and of naphthalene as a deterrent could not be obtained through the absence of attacks due to drought conditions.

Preventive measures include: (i) The removal of shelter—banks of earth, soil and turf heaps, and weeds—in which the beetles overwinter or find harbourage during the daytime; (ii) the production of a fine tilth, so that the top layer of soil is too dry for the beetle larvæ to live in; and (iii) the judicious use of poultry on headlands, rough lands, and banks to prevent invasion of the strawberry beds.

G. F. W.

Tulips, Aphides as Vectors of "Breaking." By A. W. McKenny Hughes (*Ann. App. Biol.*, vol. xviii. No. 1, Feb. 1931, pp. 16–29; 1 plate).—The experiments described in this paper confirm the results obtained previously (*R.H.S. Jour.*, **55**, p. 299), that two species of Aphis, *Myzus persicae* and *Macrosiphum gei*, carry the virus of "breaking" from broken to normal tulips. An indication is that the virus of tulips can be transmitted more readily from some varieties than from others.

A higher percentage of "break" is obtained under glasshouse conditions than in the open.

There is no indication that "parroting" is due to any widespread virus or that it is transmissible by the two aphid species.—*G. F. W.*

Winter Moth Caterpillar Attack on Fruit Trees in 1929–1930, Some Observations on. By S. G. Jary (*Jour. S.E. Agric. Coll., Wye*, 28, 1931, pp. 137–146).—An endeavour was made to elucidate the following points, viz.: (i) the period over which the various species of moths appear and lay their eggs, including the period of maximum emergence in Berkshire—the period of emergence of *Cheimatobia brumata* was from Oct. 24 to Jan. 30, while the maximum emergence varies according to the locality; (ii) the relative numbers of the various species of moths—at least 99 per cent. of the ♀ moths taken were *C. brumata*, while *Hybernia defoliaria* accounted for most of the others; (iii) the position in which eggs are normally laid on the trees—the eggs of *C. brumata* were deposited mostly on the smaller wood and fruit spurs, and one-fifth of the total number of eggs were completely concealed, hidden beneath bud-scales, dead bark, etc., while many eggs were deposited on support stakes; (iv) the efficiency of grease-banding as a means of control—the presence of a grease-band must not be regarded as a means of doing anything more than mitigating an attack, for even the most carefully applied bands did not entirely prevent attack; (v) the efficiency of various types and strengths of Tar Oil washes as ovicides in connexion with the eggs of Winter Moths—a Tar Oil wash of the Long Ashton type gave no better control than an old type of Tar Oil wash when used at the same strength, *i.e.* 10 per cent.; and (vi) to discover whether eggs hatch if they are laid in concealed situations where a wash may not touch them—concealed eggs do not appear to hatch in any greater proportion than eggs laid superficially, at least Tar Oil washes certainly fail to kill some proportion of the eggs which are laid superficially, as well as some of those which are totally hidden.—*G. F. W.*

Woolly Aphis, Preliminary Experiments on the Physiology of the Resistance of Certain Rootstocks to Attack by. By W. A. Roach and A. M. Massee (*Ann. Rept. East Malling Res. Sta.*, April 1931, pp. 111–120; 1 plate, 2 figs.).—An investigation into the nature of immunity of certain apple stocks to attacks by *Eriosoma lanigerum* Hausm. indicates that the immunity is not of a mechanical, but rather of a physiological, nature.

Extracts of bark of immune trees when injected into susceptible ones, and conversely, did not affect the reaction of the host to the parasite.

Methods are described whereby Woolly Aphis can be grown on solid and liquid media. The length of life of the adult insects was apparently unaffected by extracts of either immune or susceptible trees. The results of one experiment, however, suggested that the rate of reproduction was depressed more by 'Northern Spy' than by 'Allington Pippin' extract.

A yeast and a filamentous fungus, *Cladosporium aphidis*, has been found associated with the Woolly Aphides obtained from seven different sources, and it is suggested that the yeast may be of importance in the nutrition of the aphides.—*G. F. W.*

Woolly Aphis, The Resistance of Certain Apple Stocks to Attacks of the. By A. M. Massee (*Ann. Rept. East Malling Res. Sta.*, April 1931, pp. 202–205).—Investigations in relation to the resistance of certain apple stocks to attacks of *Eriosoma lanigerum* Hausm. have been in progress at East Malling since 1920 (see JOURNAL R.H.S., **53**, pp. 423–424), and as a result it has been found that a number of apple seedlings proved to be immune.

The immunity character has been established so far for 'Northern Spy' × 'Doucin' and 'Ivory's Double Vigour.'—*G. F. W.*

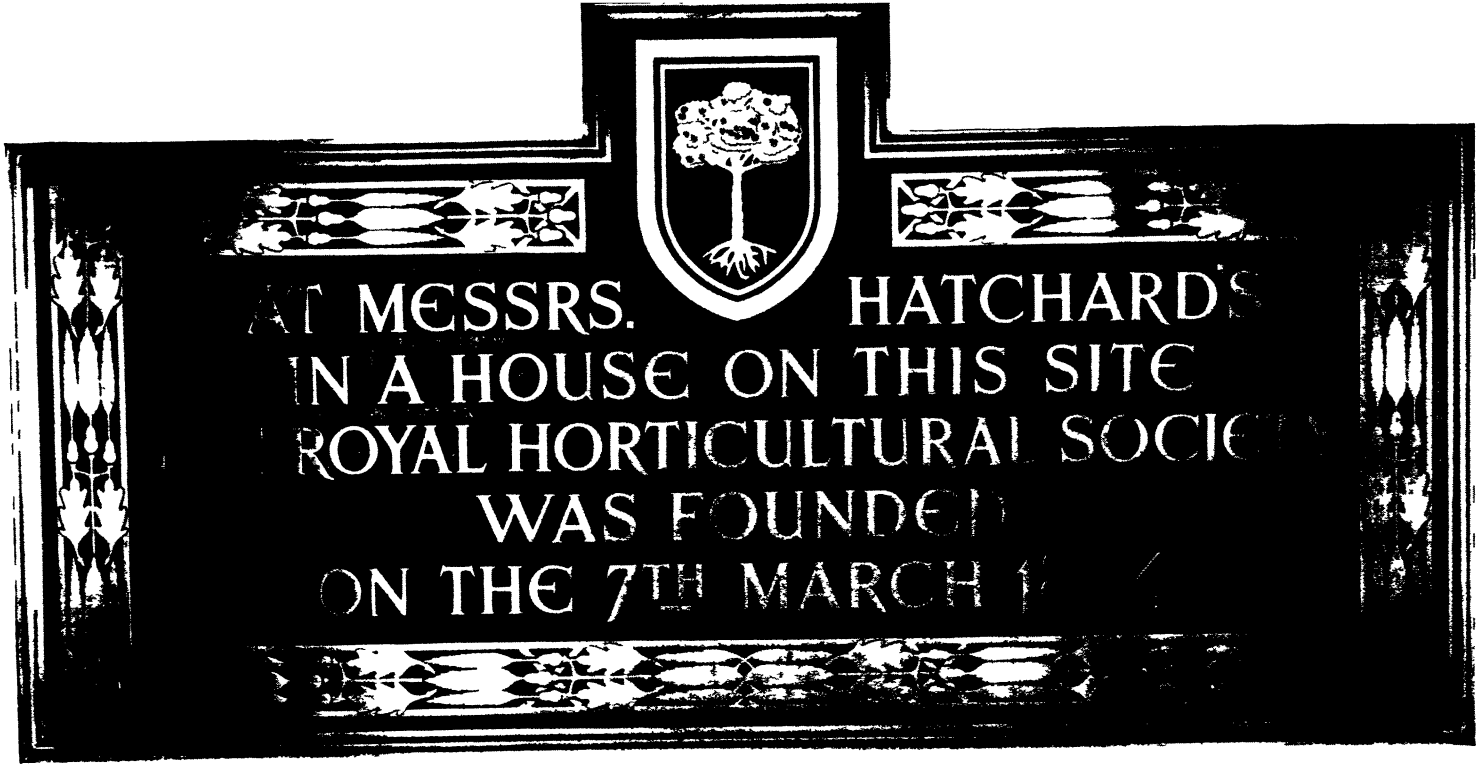


FIG 49

To face p 157

JOURNAL

OF THE

ROYAL HORTICULTURAL SOCIETY.

VOL. LVII. PART II. 1932.

THE FOUNDING OF THE ROYAL HORTICULTURAL SOCIETY.

UNVEILING OF A COMMEMORATIVE TABLET.

ON March 7, 1932, the Hon. HENRY MCLAREN, President of the Royal Horticultural Society, unveiled a tablet and illuminated record commemorating the Foundation of the Society by Mr. John Wedgwood on March 7, 1804, at Messrs. Hatchard's, 187, Piccadilly. The President was supported by Mr. GERALD LODER, Past President of the Society, Sir RALPH WEDGWOOD, and Miss ALLEN, the granddaughter of the Founder, members of Council, Fellows and friends of the Society.

Mr. GERALD LODER, in calling on the President to unveil the illuminated record, said:

Fellows and Friends of the Royal Horticultural Society,

The Council has asked me to say a few words on its behalf before I call on the President to perform the ceremony which has drawn us all here this morning.

We are here to commemorate what is obviously the most important event of our history, namely, our foundation, and we have chosen the 128th anniversary of that event to do honour to those men who launched the Society on its long, useful, and prosperous career.

We are placing these records, so beautifully designed and so skilfully executed by Mr. HENDERSON, in the place where the first meeting was held—in the famous house of HATCHARD'S, by their kind permission.

Of the names which will be disclosed to your view in a moment, that of JOHN WEDGWOOD comes foremost. The conception was his, and his was the zeal and inspiration and the labour which carried the project through. He was the son of an illustrious father, a member of a distinguished family, some of whom, I am glad to say, are with us this morning—a family which, it may not be inappropriate to remind you, share in the glory of having given CHARLES DARWIN to the world. In a word, JOHN WEDGWOOD was our founder.

Next comes BANKS—the mighty, the immortal BANKS, whose influence was such that at that time no project for the advancement of science had any chance of success without his support. What need I say about BANKS's services to horticulture, and, indeed, what necessity is there for detailing to you the services rendered by the others whose names will presently be disclosed to your view? There were CHARLES GREVILLE, RICHARD ANTONY SALISBURY, WILLIAM TOWNSEND AITON, WILLIAM FORSYTH, and JAMES DICKSON, all of them stars in the horticultural firmament. They were earnest and eminent men; but they were also very modest men. You will hardly believe it, ladies and gentlemen, but at that first meeting they decided that the number of Fellows should be limited to 28. Could those eminent and earnest men have been vouchsafed a glimpse into the future; could they have seen the vast concern represented in the 28,000 Fellows now constituting this Society, and the still vaster throng of horticultural enthusiasts scattered all over the world, permeating every community and captivating every class—could they, moreover, have realized the pre-eminence to which the Society has attained, most assuredly they would have felt that they had been rewarded for their labours.

You may think that, inspired by the occasion, I am using somewhat flowery language; but I think it may be claimed for the Royal Horticultural Society that, though it has undoubtedly encountered in its long career many vicissitudes of fortune and of fashion, it has been an instrument for good and an inspiration for the promotion of Horticulture. It is therefore with pride and with gratitude that we erect this tribute to the memory of our founders as a sign for future generations of the debt we owe them, in high hopes that the future may have in store still further and yet wider opportunities of bringing home to generations unborn the refining and elevating influence of Nature in her most attractive manifestations.

Mr. President, I now have the honour to ask you, on behalf of the Royal Horticultural Society, to perform the ceremony to which we are all looking forward.

Mr. MCLAREN: Mr. LODER, Sir RALPH WEDGWOOD, Miss ALLEN, and Fellow Members of the Royal Horticultural Society,

Before I actually unveil this plaque, I should like, firstly, to express the indebtedness of the Society to our ex-President, Mr. LODER, for the way he has investigated the early beginnings of the Society, and

for the trouble he has taken in seeing to the preparation of this plaque indoors and the tablet which will be displayed outside the building; and, secondly, I would like to express our gratitude to Messrs. HATCHARD for the facilities that they have so kindly given to us, not only for our initial meeting, but for the placing of the tablet, and for the ceremony to-day.

This ceremony records a notable activity in the life of a body of very distinguished men who lived generations ago, and it also affords an interesting retrospect into the beginnings of our Society. It is very pleasant to think that in the century and a quarter since the Society was founded, not only has the family of the founder of the Society prospered and risen to distinction in many walks of life, but the house of HATCHARD has also flourished and become larger and more prosperous, and, lastly, the Society itself, as Mr. LODER has told us, has extended itself beyond all belief. The only thing that has passed away is that little nest-egg, the entrance fee, which was abolished only a few weeks ago.

Little could our founder, WEDGWOOD, and his friends have anticipated how large a tree would grow from that small seed they sowed. Those 28 original members have grown to nearly 1,000 times their original number, while that original capital of 28 guineas is now represented by nearly £10,000 for each and every one of those guineas.

The Society has grown like this because the original idea was a sound one, namely, that whether you number 28 or 28,000, you make a greater success of the work in which you are interested if you do it all together rather than if you do it separately.

Another thing has contributed much to the prosperity of the Society, and that is the increasing interest which is taken in new and rare plants.

In the old days we read of plants, even such beautiful plants as the American Azaleas, being adapted for 'the gardens of the curious.' We must, I think, be growing—to quote the words of Alice in Wonderland —curiouser and curiouser, for whereas when the Society was founded, there were only a few people curious enough to grow rare plants, now they are numbered by their tens of thousands. It is to increase the knowledge of plants that the Society works—to increase the number of varieties, to improve their quality, and, above all, to disseminate that knowledge and to secure the dissemination of those plants among the largest possible number of persons.

Ladies and Gentlemen, I now proceed to unveil this plaque to your view, and, in doing so, I would wish the Society and the house of HATCHARD all possible success.

The tablet on the outside of the building will be on view to you as you go out, and I think that you will agree with me that Mr. HENDERSON, the artist who has designed and carried out the work, deserves our warmest congratulations.

The President then unveiled the commemoration plaque.

The ceremony was brought to a close by a vote of thanks to Messrs. HATCHARD for the permission granted to the Society for the placing of these records moved by Sir RALPH WEDGWOOD, who said:

Mr. President, Ladies, and Gentlemen,

I feel it a great honour to be called upon to address you on this occasion. I appreciate the implication of that honour in my relationship, although it is rather that of a collateral descent, to your founder, JOHN WEDGWOOD. Though I have no claim as a direct descendant, perhaps I may be regarded in that as the representative of Miss ALLEN.

It is, perhaps, surprising that JOHN WEDGWOOD should have come forward as he did to found your Society, considering the many disadvantages under which one might have supposed that he suffered in approaching the subject. . . . In the first place, his youth was spent in North Staffordshire, and though I yield to no one in my admiration for my native county, still it cannot be regarded, I am afraid, as a gardener's paradise. Secondly, JOHN WEDGWOOD was known as being pre-eminently reserved amongst a reserved generation. He was kindly, persistent, and methodical at the same time, and it must have been that persistence and love of method that led him to take what to him must have been the very difficult step—that of calling together the first meeting which founded the Royal Horticultural Society. Perhaps it was something in his blood. As Mr. LODER has said, his sister was DARWIN'S mother, and his niece was DARWIN'S wife. It may have been that which enabled him, in spite of his upbringing and his natural reserve, to take that very marked step which you are commemorating to-day.

May I say how grateful we are to Messrs. HATCHARD for allowing us to put this tablet up? There is something peculiarly appropriate in recalling the founding of the Royal Horticultural Society in this place, and that is the natural kinship which exists between a library and a garden. They both are places which speak of cultivation and contemplation, and a lover of gardens will, I like to think, also be a lover of books. A more appropriate place than Messrs. HATCHARD'S could not be found for this memorial.

The tablet on the outside of the building and the illuminated record within the building itself are the work of Mr. A. E. HENDERSON, F.S.A., F.R.I.B.A.

Messrs. HATCHARD, in celebration of this occasion, laid out an interesting display of old botanical and horticultural books, the Society loaning the original Minute Book of the year of foundation (see figs. 51 and 52).

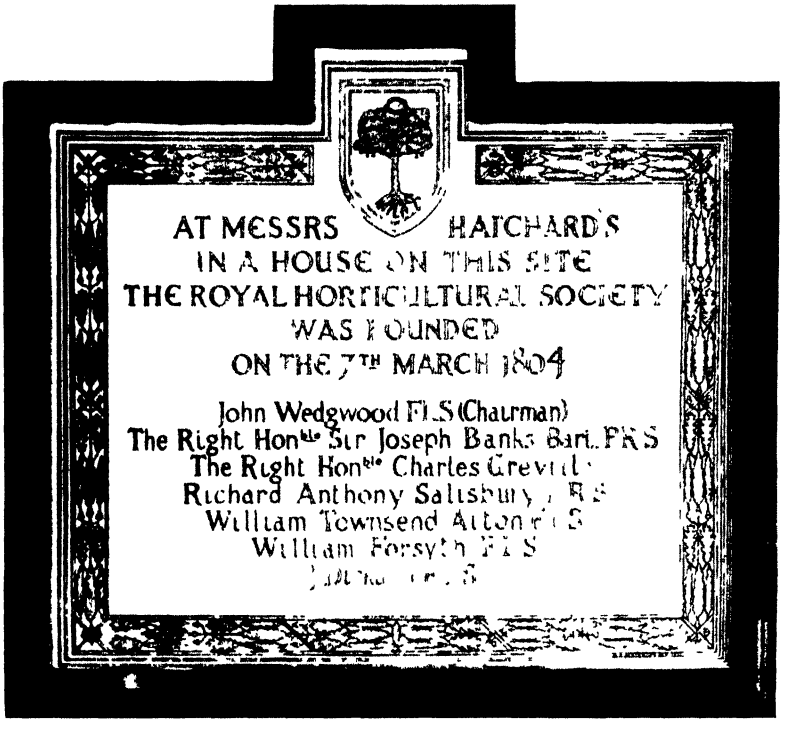


FIG 50.

To face p 160

Piccadilly, March 7 1804

At a Meeting held at Mr Hatchards House for the purpose of instituting a Society for the Improvement of Horticulture

Present

The Rt Hon Charles Greenville
The Rt Hon Sr Joseph Banks Bt
Mr Salisbury
Mr Aiton
Mr Forsyth
Mr Dickson
Mr Wedgwood

Mr Wedgwood was requested to take the Chair.

A Paper which had been circulated among a few Persons by Mr Wedgwood was read

Resolved,

That this Paper be approved as the Foundation of the Society but that the Rules proposed to be not considered as referred until the Society has actually met

That the Original Society shall consist of fifteen Members, eight Members to be recommended by the Gentlemen present, and confirmed by the Approbation of the next Meeting

That each Person present shall have the Privilege of recommending three Persons for the Approbation of the next Meeting

That each Person on paying the Sum of Two Guineas into the hands of the Treasurer shall be entitled to Admission into the Meetings of the Society, and to receive Ten Copies of each Number printed

That Mr Wedgwood be requested to act as Treasurer of the Society

That the Secretary be ordered to procure such Books as may be necessary to be procured with the Monies of this Meeting to be disposed of, and to send Ten Copies to each Member present

That this Meeting be adjourned to Wednesday next the 14th Instant, then to meet at the same Place

Signed John Wedgwood Chairman,

FIG. 51. MINUTE OF THE MEETING AT WHICH THE ROYAL HORTICULTURAL SOCIETY WAS FOUNDED

(Reproduced from the Minute Book.)

Rules and Regulations for the Horticultural Society

That the object of this Society shall be to collect every information respecting the culture and treatment of all Plants and Trees as well culinary as ornamental

That every new Member shall be balloted for after a Society of [illegible] are and whereas his name is read and that every such Member at his admission shall pay one guinea besides his Annual Subscription

That the Society shall annually choose a President two Presidents a Committee of Stewards and Secretary

That the Secretary shall have the power of admitting Visitors for the time, and that no Visitor shall be admitted before it has been read at a meeting of the Society

That no Visitor shall be admitted who does not treat of Horticultural subjects

That it shall be considered within the intention of this Society to give premiums for improvements in Horticulture whenever it shall be judged expedient so to do

FIG. 52.—RULES AND REGULATIONS ADOPTED AT THE FIRST MEETING OF THE ROYAL HORTICULTURAL SOCIETY MARCH 7 1804
(Reproduced from the Minute Book)

THE ARRANGEMENT OF GARDENS: BEING ADVICE TO THOSE ABOUT TO GARDEN.

By THE PRESIDENT, ROYAL HORTICULTURAL SOCIETY.

As Broadcast on May 14, 1931.

ALL those of us who are keen on gardening know that there are a great many good gardens in this country, but we also know that there are a very great number of bad ones.

Now, where people do not care to have a good garden, of course they naturally do not get one; but there are quite a large number of people who really would like a good garden and who spend a lot of effort on it and still do not get one.

Why is this?

It is not a question of the amount of money or labour available—that should only affect the size of one's garden; indeed, the smaller the garden the easier it is to make it really a good one.

Nor is it a question of soil or situation; one can make a charming little garden of cyclamen, bulbs, and ferns—even under the branches of a beech tree; and I know a man who actually brings cartloads of such an unpromising material as cinders to his rock garden for his rarest plants to grow in. Town smoke is of course a drawback, but, even then, look at the wonderful lot of things that are grown in Hyde Park.

Of course, it is much easier to grow things in a light rich soil in the kind of climate people get in Cornwall, and there one naturally would have a much wider choice of plants—but one may have a good garden almost anywhere if one sets about it in the right way, and you can have a bad garden *quite* anywhere if you tackle it in the wrong way.

The whole thing chiefly depends on how you arrange your garden—and by arranging, I mean the selecting as well as the placing of the plants; this is a matter that one has got to think out and study most carefully if one wants a good garden. Head work of this kind should always come before the actual spade work, for it is the arrangement that makes all the difference.

I would suggest that the first thing to do in arranging a garden is to decide what *types* of plants will really succeed well, first, in your climate, secondly, in your kind of soil, and thirdly, in the amount of shade or sun that you can offer them.

Of course, as far as soil is concerned, you can do quite a lot to alter and improve it—in fact you can change small patches of it altogether if you really want to do so; and you can also alter the amount of shade or sun by cutting or planting trees.

Now for nearly every kind of soil and every kind of site there are many fine races of plants that will do really well, and in your garden arrangement seek these out. For instance, in a bleak, shadeless, shelterless garden with poor light soil, Cistus and brooms and sun-loving bulbs and most rock plants grow to perfection; in a rich and stiffer soil with shelter, roses, most herbaceous plants, and many deciduous shrubs are at their best; while in thin woodland with a leafy soil the shade-loving bulbs and (in the absence of lime) Rhododendrons will thrive.

Keep to the type of plant that likes your garden unless you want an uphill struggle and a garden of disappointments, or indeed unless you are the kind of collector who likes uphill struggles and would prefer to have a pet plant present and sickly, rather than absent altogether.

Having decided, then, either from your own knowledge, or from advice, or by looking at other similar gardens, or, best of all, by experiment, what types of plants will do with you, you will next have to decide which of these types appeal to you most and which would suit the shape and size of garden that you have got and the amount of labour that is available.

For a given area shrubs take the least labour; mown grass probably takes more; then come herbaceous borders and roses, while rock gardens take the most of all, but of course the labour on a rock garden is lighter and more interesting.

Having decided what types of plants you are going to grow, the next thing is to consider how best to place them in your garden. Let us take shrubs to start with.

Now to grow shrubs successfully they *must* be grown in beds, deeply trenched—it pays hands down to trench for shrubs; you get twice the growth and twice the beauty in the individual plant. But there is yet another argument for growing shrubs in beds even more important, and that is this—a well-arranged garden must have breadth —repose—simplicity; must not be all dotted and confused with ill-assorted and contrasting plants; of all mistakes fussiness is the most destructive of the beauty of a garden, and unfortunately it is the most difficult to avoid.

Now if you mass your shrubs in a bed you get that breadth and simplicity which you want, and you can plant a varied collection without seriously spoiling the effect. If your bed is among trees or on undulating ground, the shape of the bed is of course more or less determined for you, but if you garden in the open and on the level, have your bed or beds straight as in those excellent examples near the temperate house at Kew.

Then while your shrubs grow and where gaps are left, there is ample opportunity for planting among them in the beds the stronger perennials or bulbs, or such plants as Dahlias if your fancy lies that way.

Next comes your lawn; I suggest that you keep it absolutely unbroken (unless it be by a great tree)—no shrubs, no beds, no orna-

ments, no paths to break it up ; keep your beds, your paths, and your shrubs bordering your lawn, not breaking it. Then you will have a restful and beautiful lawn ; and remember that turf never looks so well as when it is rectangular—spread like a green carpet in the garden.

The herbaceous bed or border requires far more skill to plant it and far more labour to maintain it than the shrub border ; so much has been written about it that I will not do more than say that if in any way possible it should be long and straight, that an edging of flags or bricks laid flat makes a convenient path along it in winter and allows in summer the plants to grow outwards without spoiling the turf, and that a few permanent evergreen plants of good outline such as Yuccas are useful in preventing it from looking too bare in winter. But unless the herbaceous border can be quite long and dignified, I am inclined to think that a better plan is to have a herbaceous court or yard, or whatever one likes to call it ; I mean an enclosure of walls or hedges planted solid with herbaceous plants (except, of course, for the paths).

The smaller the enclosure, the smaller in size would be the general run of your plants, until in a very small enclosure the strong growers could be eliminated and the plants might be largely alpines and semi-alpines, grown in a flat moraine.

Take next the rose garden.

Some twenty-five years ago I saw a certain rose garden ; I copied it slavishly and I have never regretted the plagiarism, for I have never seen a better rose garden. It was Mr. William Robinson's rose garden ; a wide formal terrace was divided up by old flagged paths into many rectangular beds perhaps 12 ft × 6 ft. each, and raised 6 ins. above the paths and bordered by flags on edge. The beds, of course, were full of roses, and all round the edges of them were planted prostrate rock plants—Alpine Phloxes, Campanulas, Lithospermum, Pinks, Violas, and others like them—which grew from the beds and spread out over the flags. In the middle of the beds between the roses can be planted tulips. Such a garden is a thing of beauty in April and May long before the first rose appears, and in the summer the foliage of the rock plants sets off the roses when they are in bloom. Indeed, it is the brightest part of the garden from April to October, and if you want a formal garden near the house which should look well all the spring and summer there is nothing to beat a rose garden like this.

One more piece of head work must precede the spade work.

Having chosen the kind of plants you want and having planned their setting in your garden, see to it that you get the very best of each kind. Why grow a chance seedling Delphinium when you yourself can choose a picked and named variety ? Why grow *just any* Rhododendron when the very best are available ? A very large garden has perhaps got room for some second-class plants ; a small garden has only room for the very, very best ; go yourself to shows or to a nursery, take a note-book, compare one variety with another and choose only one you think the best. If when you grow it you find it

has defects, don't hesitate to burn it and try another variety in its place.

One more word; when you get a really first-class plant that does thoroughly well with you, don't confine yourself to one plant or to six—make a real effect of it. No garden is too small to hold a clump of 100 *Lilium regale*—which can be raised to flower in two or three years from a couple of shillings' worth of seeds; no garden is too small for a few square yards of *Gentiana acaulis* (if it flowers with you) or of *Gentiana sino-ornata*, which increases five-fold every year, or for a mass of *Lithospermum prostratum*, if the soil be dry and warm, or for a planting of *Thalictrum dipterocarpum*, if the slugs permit, or for a stretch of *Meconopsis betonicifolia* in half shade.

Such plants as these, and there are many more, which are of outstanding beauty, should be used to make a real effect in your garden which your friends and (more important still) which you yourself will vividly remember all the year until they bloom again.



FIG 3 THE MAIN ENTRANCE TO SANDRINGHAM HOUSE
THE NORWICH GATES

[To face p 104



FIG. 4.—THE APPROACH TO SANDRINGHAM HOUSE



FIG. 33. THE MAIN ENTRANCE TO THE ROYAL GARDENS
SANDRINGHAM



FIG. 5.—MIDDLE WALK IN KITCHEN GARDEN AT SANDRINGHAM

To face p. 15

THE GARDENS OF THEIR MAJESTIES THE KING AND QUEEN AT SANDRINGHAM.

By Mr. T. H. Cook.

Sandringham, originally "the hamlet of the sand meadow," the Norfolk home of Their Majesties The King and Queen, has been described, I think aptly, as "a bit of Scotland brought south of the Tweed."

Pine woods, *Rhododendron ponticum* and graceful Silver Birches abound, and freely reproduce themselves along the fringes of broad expanses of heathlands adjacent to the sandy Sandringham Heights, from which can be seen the Wash and the intervening marshes, which have been reclaimed from the sea—rich clay grazing lands, protected by many miles of high banks. There is therefore a great diversity of soils—sand, chalk and marl, and samples of all are found within the confines of the Pleasure Grounds and Gardens.

Naturally the native flora is rich and varied; seashore, marshland bog, heathland and sandy upland meadow are all here, while lands and woods support an abundant bird and animal life unsurpassed for variety in any part of the kingdom.

It has been a royal demesne since 1861, when it was purchased from the Hon. Spencer Cowper for his late Majesty King Edward VII, then Prince of Wales, who two years after, upon his marriage, took up residence there.

Sheep and cattle at that time grazed upon what are now trim lawns and flower gardens.

His Majesty, a great patron of Horticulture, immediately set about beautifying and enlarging the grounds and gardens.

The house, too, was practically rebuilt and made fit for a Royal residence.

Much has been done in more recent years further to adapt it to modern requirements. The main entrance is from the north, through the famous Norwich Gates, which were given by the people of Norfolk as a marriage present to the Prince of Wales in 1863.

At that time an avenue of Lime trees led up to the house, but in February 1908 a gale uprooted them, necessitating the remodelling and extension of this part of the private grounds.

The house is in the Elizabethan style, and is on a terrace, overlooking to the west the main flower garden, beyond which are the deer park and church.

The walls of the house are clothed with creepers. Conspicuous in early autumn by reason of its intense leaf colouring, no doubt due to the sandy nature of the soil, is *Ampelopsis inconstans*; Roses and

Jasmines intermingle with Wistaria; *Chimonanthus fragrans* and *Lonicera fragrantissima* flower in January and February; *Ceanothus Veitchii, Clematis Henryi, Cydonia japonica rosea, Azara microphylla* and *Euonymus radicans variegata* are others, while *Pyracantha coccinea* and *P. Gibbsii* grow well and berry freely. In sheltered bays *Aloysia citriodora* is planted and is esteemed for its pleasantly scented foliage.

Flower Garden.—West of the house, and immediately in front, is situated a parterre of formal design of variously shaped beds, which until recently had, dotted at intervals, closely clipped cone-shaped specimens of Golden Hollies and Yews.

These have been transplanted elsewhere, and walks that bisected this garden have been turfed over and the beds reformed, though retaining to some extent their original design. The beds are planted for spring and summer effect. In the latter season the blending of pink shades of colour with grey foliage is favoured.

Dahlias, Stocks, Antirrhinums, Pentstemons and Larkspurs are some of the plants that have supplanted the Lobelia-edged beds of variously coloured Geraniums, Calceolarias, etc. The beds on the terrace, close up to the house, are planted with Heliotrope, having tall standard trained specimens as dot plants. Tall *Calceolaria amplexicaulis*, with a groundwork of *Aster rotundifolius*, Fuchsias, Humeas, Scented-leaf Geraniums, Tobacco plants and Verbenas are also planted, their fragrance being wafted through the windows.

All of these beds are planted in the autumn with Wallflowers, Polyanthus, Myosotis, Daisies, Pansies, Hyacinths and early May-flowering Tulips. Towards the south end of the terrace and in line with the house is an herbaceous and mixed flower border backed by shrubs. Opposite this border is another series of box-edged beds with gravel walks between them, reminiscent of a style of flower gardening seldom practised nowadays. This is the Pansy Garden, so called from its being constantly planted with various types and colours of this flower. It is a sunk garden in the form of a semi-circular scroll, and in the centre is an old Italian well-head.

The Nest.—A narrow pathway leads to a small rock garden, in which is situated a summer house built of Sandringham shell car-stone, having a large boulder for its foundation, and being approached by some rustic steps. This looks out upon the upper lake and towards the Dell and its waterfall.

The Rock Garden (fig. 60) is formed of block car-stone quarried in the neighbourhood, and contains two small pools and a miniature cascade, fed from a tiny stream coming out of the boulder on which the summer house stands. Here popular spring and early summer flowering plants flourish and display their beauty within reach of close inspection, for narrow pathways and stepping-stones down to the edge of the lake give easy access to every part; amongst them are many varieties of Aubrietia, Alyssum, Dianthus, Lithospermum, Gentian, Ramondia, Helianthemum, Saxifrage, Sedum and Primula.

A fine specimen of Pulham's early rock work adjoins, in the form

of a boat-house and grotto, lofty and boldly conceived, and skilfully formed with very large boulders of car-stone.

Upper Lake.—The view from this rock garden across the lake to the west is one of great beauty, especially heightened when Birch, Pine trees and Rhododendrons are mirrored in the placid water (figs. 57, 58).

Planted on the sloping grass banks opposite, and backed by large clumps of Rhododendrons, are groups of *Azalea mollis*, interspersed with *Lilium giganteum*, *L. regale*, Foxgloves, Japanese Acers, *Hamamelis arborea* and *Forsythia suspensa*. Large patches of *Saxifraga peltata* in early spring give a wealth of pink blossom, and are no less beautiful in the autumn by reason of their richly autumn-tinted foliage; *Iris Kaempferi*, *I. sibirica*, Willow herb, Giant Butter Bur, Scarlet Dogwood and Golden Willow, whose bright-coloured bark shows to advantage against a background of Bamboo in winter, also flourish here.

Prominent on a curve of the bank is a striking group of *Gunnera manicata*, whose broad six-foot leaves are borne on giant stems, while on the margins of the lake *Primula japonica*, *P. Beesiana*, and hybrids, *P. denticulata*, *P. rosea*, *P. luteola* and *Senecio clivorum* are quite at home. Planted in various parts of the lake Water Lilies grow and flower with great freedom, notably *Nymphaea Laydekeri rosea*, *N. Marliacea* var. *alba*, and var. *carnea* and *N. Robinsonia*.

An island with rocky edges is planted with double-flowering Gorse, Brooms, Willows and many Ferns, and in the centre is a low-spreading Hornbeam, whose lower branches afford a screen to hide the nests of waterfowl which find a secure home there.

A pathway round the lake passes the Old Norwich Gates bearing the date 1724. They were the principal entrance gates when King Edward took possession of Sandringham, but were removed to their present position when the new gates (fig. 53) were erected in 1863.

Close by is an Oak of massive proportions, measuring 22¾ feet in girth 3 feet up the trunk, and a story is told in connexion with it:

The late Mr. Gladstone made a practice of felling a tree wherever he visited. Knowing this, King Edward, then Prince of Wales, on an occasion of the great statesman being at Sandringham, ordered his axe to be placed against this huge tree and invited him to commence operations; but for obvious reasons the "Grand Old Man" declined.

York Cottage.—Across the lawn from here York Cottage can be seen, standing on slightly raised ground and overlooking the Lower Lake.

York Cottage (fig. 59) was the early home of Their Majesties The King and Queen, and here were born the Princess Royal and the Royal Princes her brothers, excepting H.R.H. The Prince of Wales.

Here on the north lawn is a fine group of *Sequoia gigantea*. These trees were planted from 5-inch flower pots in 1865, and the finest specimen to-day has reached the height of 96 feet and has a girth, measured 3 feet from the ground, of 17 feet. At the ground level the girth measures 26 feet.

The Lower Lake is several acres in extent, and has two islands, the larger one reached by a rustic bridge having stone arches. The main feature is a grand old Oak with a trunk girth of 21 feet 4 inches, which has unfortunately seen its best days.

The sides of this lake are planted with large beds of pollarded Scarlet Dogwood and Golden and Bronze barked Willows (planted for winter effect), *Polygonum sachalinense*, *P. oxyphyllum*, Bamboos, *Juniperus Sabina*, Spiræas—shrubby and herbaceous—Weeping Willows, Elms and Birch, while *Typha latifolia* and Water Lilies adorn the shallow and deeper waters.

The Maze and adjoining Bog Garden, hidden from view by thickets of *Bambusa japonica*, *B. fastuosa* and Rhododendrons, are other features of interest here.

A swampy piece of ground has been converted into a small lake, fed by a stream running through the easterly part of the grounds.

The soil taken out to form the lake was thrown up into mounds and the whole suitably planted. Three rustic bridges span the stream and narrow part of the lake, which add to the effect and charm of this quiet corner.

The Dell, one of the most picturesque spots, is an exquisite and cool retreat, where the sound of trickling water is heard as it enters the grounds from the park beyond. The little stream falls into a shallow pool, the secluded bathing-place of numerous feathered songsters, and a favourite haunt of the nightingale.

The banks rise sharply on either side, and a narrow path leads down to some stepping-stones dividing the small pool from one considerably larger. From the latter the water flows over a rocky cascade into the Upper Lake.

One bank is planted with Bamboos, of which *Bambusa fastuosa* has outstanding fishing-rod-like canes, *Arundinaria nitida* and *Phyllostachys viridi-glaucescens* have graceful distinct growths, and there are quantities of the useful *Bambusa japonica* which seems to flourish everywhere.

Another bank is surmounted by tall Birches, Hawthorns and Cedars, the branches of which are entwined with stems and growths of wild Clematis, Traveller's Joy, and long trailing growths of a free-flowering old Ayrshire Rose. These, being allowed to ramble freely and intermingle, give a natural and pleasing touch to the scene. A strong seedling *Eucalyptus whittingehamensis* is making rapid growth; *Magnolia* × *Soulangeana* and *Clerodendron trichotomum* are two other noteworthy objects when in flower.

Rhododendrons are here in quantity and variety, and are margined with groups of *Meconopsis betonicifolia*, *M. Wallichii*, herbaceous Spiræas, Autumn Crocus, Winter Snowflake and stretches of Daffodils planted in the grass.

Church Walk and Memorial Trees.—Another interesting feature of the west front is the Church Walk, with its avenue of Scotch Firs making a fine frame to a beautiful view of the Deer Park and church



FIG. 57. UPPER LAKE AND BOAT HOUSE IN THE ROYAL GARDENS, SANDRINGHAM

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Fig. 58. Upper Lake, Royal Gardens, Sandringham



Fig. 53. York Cottage in the Grounds of Sandringham House



FIG. 9.—ROCK GARDEN IN THE ROYAL GARDENS AT SANDRINGHAM

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beyond, enhanced in the early days of spring by masses of Winter Aconites and Snowdrops. On the lawn near by many notable memorial trees are planted: tablets by the side of each tell when and by whom.

A few with their respective heights may be mentioned:

Two Beeches planted by Their Royal Highnesses the Prince and Princess of Wales in 1872 are now 71 feet high; girth of bole 3 feet up, 10 feet 11 inches.

Abies pungens glauca, planted by H.M. The King of Denmark in 1893, now 55 feet 3 inches high.

Quercus Cerris, planted by H.R.H. Duchess of Albany in 1887, is 61 feet 6 inches; girth of bole 3 feet up, 5 feet 9 inches.

Fagus sylvatica purpurea, planted by H.R.H. Princess Victoria in 1895, 37 feet high. Another planted by H.R.H. Princess Maud in 1895 is 36 feet; and another by H.R.H. Prince Charles of Denmark in 1895 is 38 feet 6 inches.

On the lawn to the east of the house a group of Oaks has been planted. It was commenced with an English Oak planted by H.M. Queen Victoria in 1889 which is now 49 feet 6 inches high; girth of bole 3 feet up, 5 feet 1 inch.

An Oak each planted by H.M. King Edward VII, H.M. Queen Alexandra and the Empress Marie Feodorovna in 1908 have made considerable growth.

Of more recent date and in the grounds adjoining York Cottage are the following: a group of Oaks grown from acorns which were picked up on the Verdun battlefields in 1917, and planted as young trees in 1920 by Her Majesty The Queen; a group of Horse Chestnuts raised from seed from the same battlefield and planted by Her Majesty The Queen at the same time; Prince Edward's Oak, planted in 1896, and Princess Mary's Oak, planted in 1916 and raised by Her Royal Highness from an acorn in 1911.

Northern Grounds and Glade.—After the gale of 1908 the old boundary wall was taken down, a new one built, and the public road was diverted for three-quarters of a mile.

The Norwich Gates were removed 160 yards farther away from the house, thus enclosing a large portion of Dersingham Wood.

The site of the old road, now known as The Glade, was filled in and turfed over. Beneath overhanging branches of Elms and Scotch Firs, on each side enormous numbers of Narcissi and other spring flowering bulbs are planted in bold irregular patches, large spaces of turf dividing the different varieties.

A conspicuous feature at the east end of the Glade and of striking beauty in the early spring months is a bank and large raised bed of *Erica carnea*. The centre of the bed has a stately group of Scotch Firs, below which double-flowering Gorse forms an appropriate setting for this lovely heath.

Part of the ground enclosed was cleared of large trees and planted with a choice selection of flowering trees and shrubs, arranged in groups on both sides of a broad, winding walk; here standard flowering

and ornamental foliaged trees are interspersed with dwarf evergreen and deciduous shrubs. The following are a few of them: *Amelanchier Botryapium, Arbutus Andrachne, A. Unedo,* many varieties of Berberis, *Betula Ermannii, Buddleia Davidi Veitchii, B. Davidi magnifica, B. globosa, Calycanthus floridus, Prunus* 'J. H. Veitch,' *P.* 'Hisakura,' *P. Padus, Cercidiphyllum japonicum,* now 29 feet high, *Cercis siliquastrum, Cotoneaster frigida* (24½ feet high), *Cydonia japonica, C. japonica atropurpurea, C. japonica Simonii,* Cistus and Cytisus in variety, Deutzias, Daphnes, *Catalpa bignonioides, Exochorda grandiflora, Euonymus alatus, E. latifolius, E. europaeus,* Escallonias in variety, the favourite being *E.* × *langleyensis, Forsythia suspensa, F. viridissima, Koelreuteria paniculata, Malus Scheideckeri, Rosa Moyesii, R. Willmottiae, Rubus biflorus, Romneya trichocalyx,* which thrives and spreads amazingly in the sandy soil, *Viburnum plicatum, V. Carlesii, V. fragrans, Pittosporum Mayi* (now 30 feet 6 inches high), many varieties of Spiræas, Veronicas and Diervillas. These and others supply a never-failing source of interest at all seasons. Part of the grounds hereabout is treated as a Wild Garden, where Lily of the Valley, Bluebells, Primroses, Snowdrops, Aconites and Daffodils push through decaying fronds of Bracken Fern, while Foxgloves, Penzance and Sweet Briars, *Rosa rugosa,* Verbascums, Pampas Grass, Willow herbs and Bladder Campions grow freely in the rough grass.

Vitis Coignetiae and *V. purpurea,* with *Clematis Vitalba,* ramble over the Yew trees near by, and have commandeered a Douglas Fir up which they have ascended to a height of over 50 feet. This mixture in autumn is a brilliant spectacle. One side of the Glade has been planted with Conifers, which are thriving. Planted in 1908, an *Abies grandis* has reached the height of 71 feet and has a girth of 6 feet 4 inches, measured 3 feet from the ground. The following is a list of other trees in this vicinity which have made good growth, and their respective heights are: *Abies nobilis,* 56 feet 5 inches; *Libocedrus decurrens,* 26 feet 5 inches; *Abies Pinsapo,* 39 feet 4 inches; *Cedrus Deodara,* 43 feet 10 inches; *Picea orientalis* 38 feet 10 inches; *Pinus excelsa,* 39 feet 4 inches; *Cupressus Lawsoniana* 'Triomphe de Boskoop,' 43 feet.

Entrance to Pergola and Kitchen Gardens.—Leaving the east lawn, a narrow doorway in the boundary wall of the Pleasure Grounds leads across the road to the Kitchen Garden, which contains the plant and fruit houses.

The massive and highly ornamental wrought-iron entrance gates were a gift to their Late Majesties King Edward and Queen Alexandra from Their Majesties The King and Queen. These gates (fig. 55) open into the Pergola, which was erected in 1905. This is substantially built and is finely proportioned, being 70 yards long and 15 feet high and wide, while the same distance separates the pillars. The square pillars are built of small red bricks and taper slightly upwards. Heavy oak beams run lengthways from pillar to pillar, and similar pieces

cross from side to side overhead; squares are thus formed, which have diagonal beams intersecting in the middle of each.

The beams are supported on each side of the pillars with bracket pieces of stout rough-hewn oak. Half-way along the Pergola an octagonal double bay is formed, in the centre of which, on two stone steps, a quaint seventeenth-century Italian well-head is placed, and on each side of this two magnificent white marble seats, designed by the late Sir ALMA TADEMA, occupy the recesses of the large octagon. The pathway is laid with flat, roughly-dressed pieces of car-stone. Spaces between the stones, except in the centre, are planted with dwarf flowering and sweet-smelling foliage plants. Two borders, 10 feet wide, on the outer sides of the Pergola, are enclosed by a low Golden Yew hedge. These borders are planted with herbs and flowering plants whose predominating colours are blue and white, consisting of Madonna and other Lilies, Tobacco plants, Humeas, Rosemary, Lavender, Alyssum, Salvia patens, Hollyhocks, *Thalictrum dipterocarpum*, Campanulas, Stocks, etc.; the Pergola is well clothed with a variety of climbing plants, which are allowed to ramble freely and hang in festoons from the beams above. Among these are Roses 'Albertine,' 'François Juranville,' 'Dorothy Perkins,' 'Caroline Testout,' *Polygonum baldschuanicum*, Aristolochia Sipho, early and late varieties of Honeysuckle, *Celastrus articulatus*, *Clematis montana*, *C. montana rubens*, *C. paniculata*, *Vitis purpurea*, *Periploca graeca*, *Lonicera fragrantissima*, *Ceanothus Veitchianus*, *C.* 'Gloire de Versailles,' *Escallonia* × *langleyensis*, *Cistus ladaniferus*, etc.

The Pergola divides a flower garden at the north end of which the head gardener's house is situated. This garden contains beds cut out in the grass, the centres of the larger ones having climbing Roses on poles, notably 'Paul's Scarlet,' while many long-stemmed weeping standards of 'Minnehaha,' 'Dorothy Perkins,' 'Hiawatha,' and 'Excelsa' are planted and present pictures of great beauty during their flowering period. Antirrhinums, Pentstemons, East Lothian Stocks, and other popular annuals and biennials make gay this part of the garden.

A Rose border runs the full length of the east side of this garden, having as a background a buttress-supported wall, covered with plants of *Solanum crispum*, *Magnolia grandiflora*, *Choisya ternata*, *Clianthus puniceus*, *Jasminum revolutum*, *J. nudiflorum*, *Azara microphylla*, *Pyracantha coccinea*, and large-flowering Clematis in variety. Provision is also made here for Dahlias in two wide borders.

The Kitchen Garden, some 16 acres in extent, is divided by a central walk 310 yards long and 4 yards wide, with broad borders of herbaceous and mixed flowering plants on each side, which from early spring to November present a pleasing spectacle of form and colour. Speaking generally, the secret of successful herbaceous border gardening is deep cultivation, a rich soil and replanting about every three years. Where extent and width of border permit, bold grouping of colours in sequence from white to blue is effective. Colour

contrasts made by groups of plants of varying forms are also favoured.

Plants of tall growth are usually placed at the back of the border, but this is not rigidly adhered to, and some are brought well forward to produce a more or less undulating effect. A fence of cordon Apples, some of which are trained over arches, forms a pleasing background, being attractive in blossom time, and again when the arches are festooned with highly coloured fruit in the autumn. The edging to these borders is of dark Staffordshire brick, which is almost hidden in summer by low-growing alpines and annuals which break the hardness of straight edges, as they are allowed to extend into the pathway.

This central walk is bisected by another running north and south with Rose borders on each side, and high arched fences of climbing Roses behind.

Where these walks intersect in the centre of the garden there is a beautiful fountain with a circular basin of red marble. This is surrounded some 14 feet away by rose-covered arches.

At the east end of the central walk two borders of Michaelmas Daisies, grouped in many choice varieties, flower in late September and October, and are an attractive and pleasing feature.

Suffice it to say that a large variety of herbaceous plants and up-to-date biennials and annuals are employed to give a lasting display throughout the seasons.

At the end of the central walk a beautiful wrought-iron gate, the design of which is a grape vine bearing fruit, opens on to the rose-border walk, having pink Hermosa Roses on each side. A fence, 90 yards long, covered with pink-flowering Roses, screens the vegetable ground beyond. By way of contrast, standards of Rose 'Hiawatha' are planted amongst the dwarf Roses, the borders being edged by the Polyantha Rose 'Jessie,' and a broad band of *Alyssum maritimum*. Passing on, the Dairy Garden is reached. It consists of a sunk garden containing some quaintly clipped Yew and Box trees in the form of armchairs, snakes on poles, birds, boats, etc. Flower beds cut in the grass on the terrace, and others with closely clipped Golden Yew edges, are filled summer and winter with bulbs and suitable foliage and flowering plants. Two sundials, one being made from a portion of Old Kew Bridge, stand on the turf at each side of the ornamental entrance gate. This garden is surrounded by a border of shrubs, amongst which Golden and Silver Hollies, double-flowering Almonds, Laburnums, Pyrus, Lilacs and Berberis predominate. Looking to the west from here, Lavender hedges on each side of another walk, extending the length of the garden, present a fine sight during the summer and autumn, the perfume being no less agreeable. High brick walls on every side form admirable shelter for the Kitchen Garden, and on them excellent examples of all kinds of hardy fruit trees of the best varieties are planted. Apple and Pear trees and fruit bushes occupy the central portions of the garden and divide its principal plots. Very large quantities of fruit, cut flowers and vegetables, forced and in

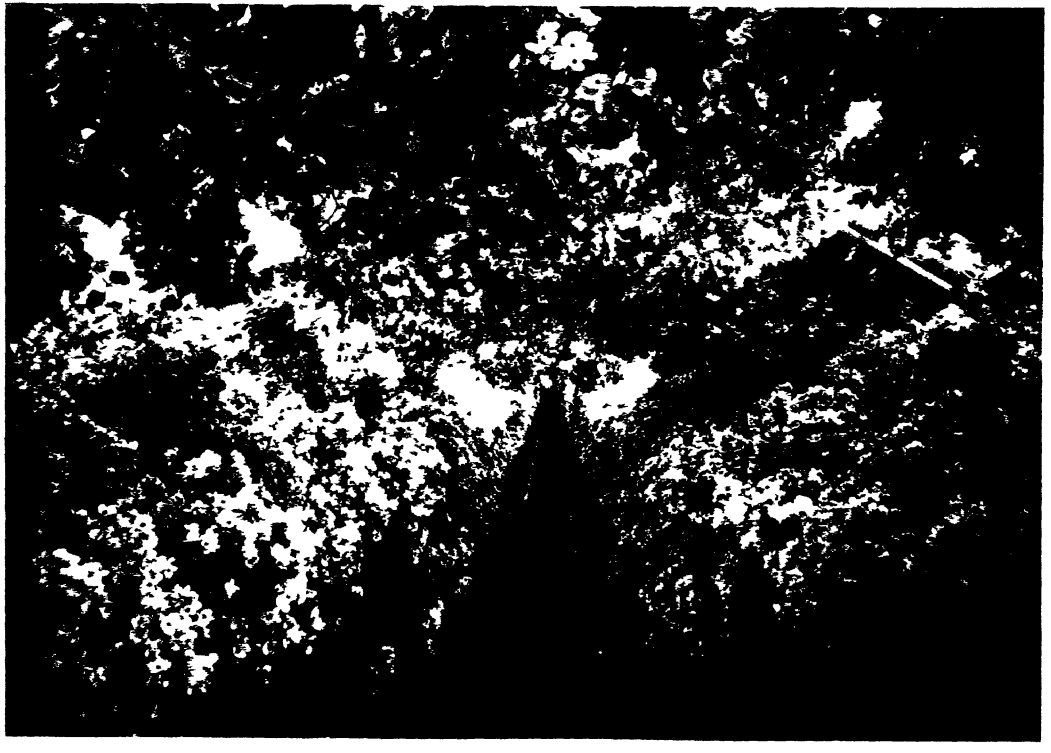


FIG. 61.—BEGONIA GLOIRE DE LORRAINE AT SANDRINGHAM

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11 CALANTHES AT SANDRINGHAM



Fig. 63. Winter flowering Carnations at Sandringham

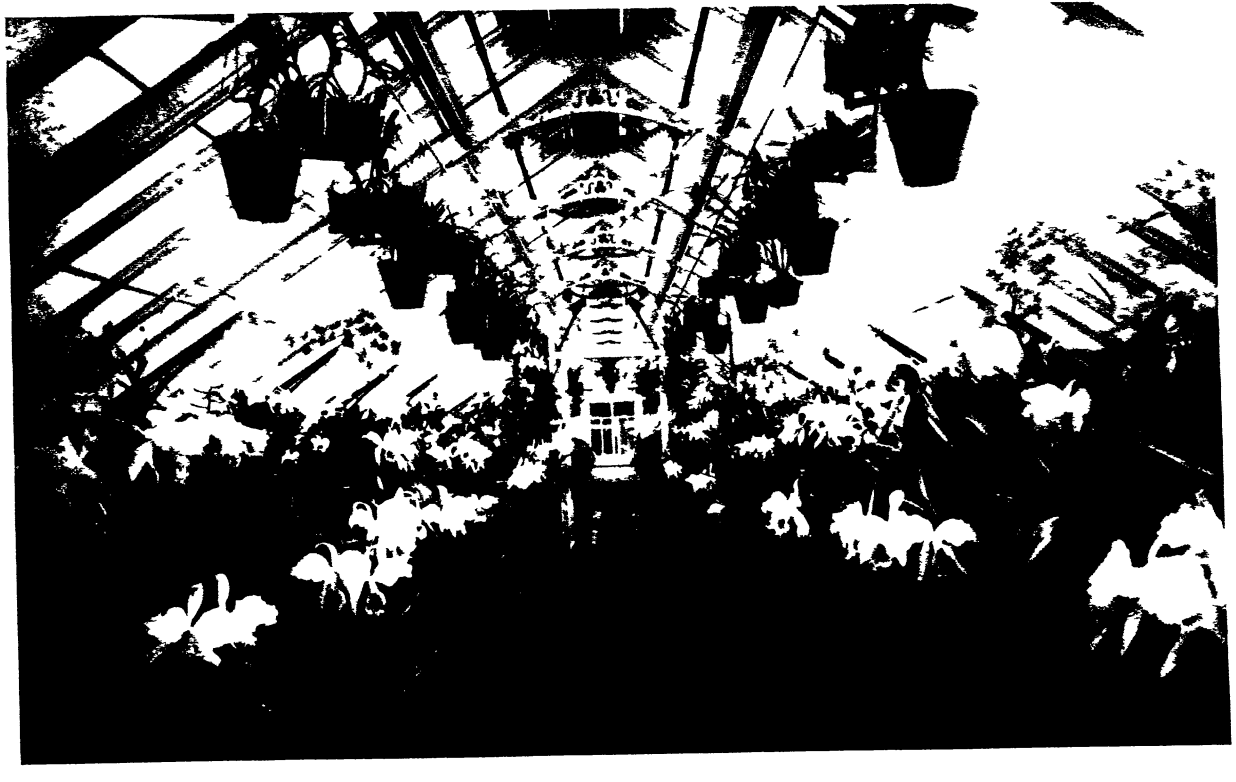


FIG. 64.—ORCHID HOUSES IN THE ROYAL GARDENS, SANDRINGHAM

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season, are required daily, and the sometimes despised Kitchen Garden demands here as much attention and forethought as any other department.

Rose fences, which have at intervals high pillar Roses, cordon Apple fences, and Lavender hedges along the sides of the principal walks are used to screen the more prosaic vegetables, and this idea prevails throughout the garden.

Fruit Houses.—There are two principal fruit ranges of the lean-to type, one 200 yards and the other 50 yards in length, on the south walls of the Kitchen Garden. These contain the best varieties of Grape Vines, Peaches, Nectarines, Figs, and a number of pot fruit trees, principally Greengages. Good crops are demanded and invariably secured, the facilities being available to ensure this.

Plant Houses.—A handsome block of plant houses, known as the " Persimmon Range " (being associated with the great horse of that name through his successes in the Derby and other classic races), are built of teak wood, and occupy a position to the rear of the fruit range.

A corridor 400 feet long, and in the form of three sides of a square, has four span-roofed ranges branching from it, consisting of three Orchid, three Begonia, three Carnation houses and one stove. Previous to the Great War, Codiæums, Dracænas, Anthuriums, and many other " hot-house " plants were grown, but later, these not being in great demand, Carnations and other cool-house plants were substituted for them.

The Court being in residence in the winter months, provision is made to ensure a continuous supply of plants and cut flowers during that period. Carnations (fig. 63) take pride of place, and the leading varieties of the perpetual-flowering types are grown in considerable quantities, while Malmaisons, in a smaller way, are also grown.

A range of three houses is exclusively filled with ' Begonia de Lorraine,' set out in various-sized pots on the side stages ; doors are removed from the centre houses, and doorways, as well as the roof, are hung with Begonias in cork baskets, and the edges of the stages are draped with trailing plants. The whole (fig. 61) appears a veritable fairy bower of exquisite pink, the effect being heightened by an arrangement of mirrors at the far end, which reflects the roof and side stages, and gives an illusion of distance. After the Begonia flowering season these houses are furnished with Streptocarpus, Gloxinias, Tuberous Begonias, ferns, etc. The next range consists of three Orchid houses (fig. 64), where a utility collection of plants for cut-flower purposes is grown. Calanthes (fig. 62) occupy the greatest amount of space, while Cymbidiums are found most useful, especially some of the Westonbirt hybrids, such as ' Goldfinch,' ' Merlin,' ' Butterfly,' ' Wheatear,' ' Vesta,' etc. Here, also, are *Cypripedium insigne*, *C. Leeanum superbum*, *C. Sanderae*, *C.* × ' Harefield Hall,' *C. candidulum*, *C. grande*, *Laelia anceps*, *L. superbiens*, *Dendrobium Phalaenopsis* and *Cattleya labiata.*

The main corridor itself is kept continuously furnished with flowering plants on the stages. A border running entirely round is

planted with creepers which cover the back wall and hang in a free manner from the roof. The same border contains various flowering and ornamental foliage plants. On entering the corridor a flourishing group of *Luculia gratissima* is planted, which, when in flower, fills the air with its delightful fragrance. A little further on, and overhead, the following claim attention: *Bougainvillaea glabra, Rhynchospermum jasminoides, Cassia corymbosa, Plumbago capensis, Chorizema cordatum splendens, Datura suaveolens, Fuchsia corymbiflora, Jasminum primulinum, Cestrum roseum, Acacia dealbata, A. armata, Passiflora caerulea* and *Streptosolen Jamesonii*. The stages are filled with groups of flowering plants, special provision being made for a bright display in winter. Quantities of *Salvia splendens, S. leucantha*, all types of Chrysanthemums, Heliotrope 'Mme. Bussey,' Zonal Pelargoniums, *Browallia speciosa* major, *Eupatorium petiolare*, Cyclamen and Primula are extensively grown. In spring an effective display is produced with Schizanthus, Clarkia, Calceolarias, Clivias, Cinerarias, Mignonette, Rhododendron 'Pink Pearl,' and a host of bulbous and hardy flowering plants that readily respond to forcing. These are followed by Lilies, Hydrangeas, Regal Pelargoniums, Fuchsias, Campanulas, Celosias, Humeas, etc.

At the east end of and just outside the Corridor, is a block of useful span-roof houses consisting of Propagating, Melon, Cucumber, Tomato, and "growing on" plant houses. Separate compartments are devoted to Cyclamen (raised annually from seed), Heliotrope, Primula, Begonias of the large winter-flowering type, Hippeastrums, Poinsettias, *Coleus thyrsoideus*, pot Roses, and *Plumbago rosea*.

Although it is impossible to mention every interesting feature, it is hoped that this account of Sandringham, from a gardener's point of view, may be of interest.

[Figs. 53, 55 and 60 are from photographs by "Sport and General," and figs. 56 and 57 from photographs by P. M. Goodchild, King's Lynn.]

GENTIANS.

By C. T. MUSGRAVE, V.M.H.

GENTIANS have been successfully grown in many natural soils, such as sand, gravel, chalk, loam, and even in the lias clay of Gloucestershire, and under conditions which would appear to be unlikely to suit their requirements. To say that some Gentians, at any rate, cannot be grown in the natural soil of any garden would be almost as untrue as to say that most of the Gentians can be grown in the natural soil of all gardens. In fact, neither would be true. It is, I think, practically impossible to attempt to lay down general rules for the successful growing of Gentians in all gardens, as the nature of the soil and the conditions of the climate vary largely in this country. It seems better to try to give particulars of the soil which experience has shown to be suitable to their requirements, and to draw attention to the conditions under which they are likely to succeed.

It is quite possible that many gardeners hesitate to try to grow Gentians, because they are supposed to be difficult. The word "difficult" is very commonly applied not only to Gentians but to other plants, especially high alpines. The difficulty, which is sometimes a very true one, may be due to the soil in which we try to grow the plants, and, so far as this side of the difficulty is concerned, it is, I believe, mainly caused by want of sufficiently quick drainage. But it is, I think, more probable that a plant is "difficult" because of the climate in which we try to grow it.

Many Gentians come from the high mountainous districts of the world, where they live in a cool, moist atmosphere with frequent mist or fog and heavy rains, and where they receive an abundant supply of underground water from the melting of the snows above them during the spring and summer. Further, in winter they are comparatively dry and protected from severe frost by a thick covering of snow. The climatic conditions of this country are totally different, and it is astonishing that a Gentian whose home may be at a height of, say, 12,000 to 15,000 feet above sea-level in China or the Himalayas, will condescend to live at all under the conditions in which we try to grow it here. The climate we cannot alter, and we must take what has been provided for us and make the best of it. But we can to some extent modify some of its most trying effects by, for instance, placing our plants in a position where they will receive partial shade from hot sun in summer, and by protecting them from excessive wet in winter by a sheet of glass. The soil, however, is under our control, and, where it is not suitable for the growing of the plants, we can remove it and replace it with soil which experience has shown to meet their wants.

There are two rules which everyone who wishes to grow Gentians should bear in mind. The first is that the plants must always have an ample supply of water during their growing and flowering season. They must never be allowed to get dry at the root. It is not suggested that Gentians will grow in stagnant water. Far from it. They would certainly not survive for long under such conditions, but many of the stronger growers like to get their roots down into cool rich soil where there is plenty of moisture.

The second is that the soil in which Gentians are planted must be well drained, and for the high alpine species the drainage must be quick and perfect. There must never be any chance of water standing on the surface and remaining round the crown and neck of the plants.

Assuming that the natural soil of a garden provides reasonably good drainage, and attention is given to watering, it is at least doubtful if anyone can say, until he has tried, that Gentians will not succeed in his garden. And even if he has tried and failed in one part of the garden, it does not follow that he will not meet with success in another part of the same garden. If he wishes to grow Gentians he must experiment for himself. In all soils except sand, he would probably find his chances of success greater if he were to incorporate some sand and leaf-mould with his natural soil. I do not suggest that he should commence his experiments with those that are known to be troublesome, such as *G. verna* and its near allies, *G. bavarica* and *G. imbricata*, but he might well begin with some of the following. He will have no difficulty in making, for instance, *G. acaulis* grow, but whether he will succeed in making it flower freely is not so certain. He should plant it in several places, as it is quite possible that it may flower freely on one side of a path, while on the other it may form, as it does here, large spreading clumps, bearing only one or two flowers. He might also try *G. septemfida*, *G. lagodechiana*, and their hybrid *G.* × *hascombensis*, and the plant sold by nurserymen under the name *G. Purdomii*.*

Again, if he has moister places or shade in his garden he might try *G. asclepiadea* and *G. Saponaria*; and lastly, he could not do wrong if he were to try *G. sino-ornata*, a most accommodating plant, which grows freely almost everywhere except on chalk, which apparently it does not like.

In well-drained loam there should be little difficulty in growing all these Gentians, including *G. sino-ornata*. In light soil it is advisable to take up this Gentian every year in March or early April, and to divide it into as many pieces as there are crowns on the plant; but in loam it may be left alone for several years and will form an almost solid mat of flower in the autumn.

* This plant is believed to be *G. decumbens*, or a form of it, and is quite distinct from *G. Purdomii* described by FARRER in *The English Rock Garden*, and from the true *G. Purdomii*. I am not sure what FARRER'S plant is, and the true *G. Purdomii* is not, so far as is known, in cultivation.



Fig. 65 Gentiana Pneumonanthe alba at Camia

(To face p. 176)



FIG. 1. GENTIANA ACAULIS GIGANTEA AT CAMBA
p. 184

Chalk also seems to suit some Gentians, especially those which root deeply, such as *G. septemfida* and *G. lagodechiana*, and I have seen *G. verna* growing well on a chalk soil. If chalk is deeply cultivated it provides as perfect a drainage as can be imagined, and, though in hot weather the top of the ground may appear to be dry, the underground water rises through the chalk, keeping the roots of the plants cool and moist.

A soil consisting of sand and peat, or of sand which has been enriched with leaf-mould, suits many Gentians admirably, and is probably the best natural soil for them. To give an example of what may be done on such a soil, Mr. J. B. STEVENSON has planted in the natural sandy peat of his garden, at Ascot, *G. trichotoma* (formerly known as *G. Hopei*), a rare and difficult plant, with the very happiest results. His plants grow and flourish in a position where they may get their roots down to underground moisture, and where they have partial shade from neighbouring trees.

Unless the soil of a garden is found to be suited to the growing of Gentians, it is advisable to make up a light, porous mixture for all those which present difficulties in cultivation. The mixture I use here is two parts light loam, one part coarse sharp sand, and one part old leaf-mould or peat, with a good sprinkling of hard sandstone grit or brick-rubble broken up into pieces about twice the size of a Sweet Pea seed.

A properly constructed and well-drained moraine with a supply of underground water, which can be turned on and off at will, would provide the ideal conditions for growing almost all Gentians, except those which require a stronger, heavier soil, or which must have shade. But well-drained pockets in the rock-garden, filled with a light, porous soil, will give the plants all they want, provided attention is paid to watering in the spring and summer. Such conditions are necessary here for success with such plants as *G. Farreri* and its hybrid *G.* × *Macaulayi*, *G. calycosa*, *G. hexaphylla* and its hybrid with *G. Farreri*, *G. Loderi*, *G. prolata*, *G. ornata*, and *G. Veitchiorum*, etc., and the same conditions would no doubt suit many others, though they may not be necessary.

Several kinds can be grown here in loam lightened with sand and leaf-mould, such as *G. sino-ornata*, *G. Parryi*, *G. lagodechiana*, *G. septemfida*, the hybrid *G.* × *hascombensis*, *G. Purdomii* (so called) *G. Przewalskii*, *G. scabra* var. *Buergeri*, *G. Saponaria*, *G. rigescens*, *G. Cruciata* and others.

Seedlings can generally be found in the spring on the rock-garden here of a few kinds, such as *G. septemfida*, *G. lagodechiana*, *G. Purdomii*?, and *G. asclepiadea*, and the last-named can be very troublesome in this respect, as the winged seed is carried by the wind and seedlings appear in great numbers, sometimes in the middle of other plants, where their presence is not at all desired.

Gentians can easily be raised from seed, which should be sown in light, porous soil as soon as available. The seed generally takes

several months to germinate, and I have found that it germinates better in a cold frame than in heat. Unfortunately the seed of any given Gentian may produce plants which vary very considerably from the parent plant from which the seed was taken. Bumble-bees appear to be the cause of the trouble. I have watched them going from flower to flower and carrying the pollen of the flower of one plant on to the flower of another. If many different kinds are grown in a small area there is no certainty of obtaining seed which will come true.

There are some few Gentians which can be increased by division. Where *G. sino-ornata* is grown in light soil it is advisable to divide the plants every year, as mentioned above. *G. acaulis* can also be easily divided and does not resent it, and the same applies to *G. Farreri*. *G. stragulata* has been divided here, but with only partial success: the majority of the divided plants succumbed to the operation. Generally speaking, Gentians extremely dislike any disturbance of their roots, and, when once established, should never be moved. If it is necessary to move a plant it is best done in the autumn. *G. verna*, perhaps more than any other Gentian, resents root disturbance, and even when it is quite small. Seedlings are best pricked out singly from the seed-pan into small pots, from which they can be transferred to their flowering position without disturbance of their roots. If pricked out into boxes the safest plan is to knock out the bottom of the box and to drop the contents carefully into a position which has been previously prepared for them and where they are intended to grow.

Some few notes about individual Gentians may possibly help others to avoid the mistakes which I have made before the wants of the plants were fully known. They are not intended for instructions for the cultivation of Gentians, and represent merely my own experience in a garden in the Surrey hills, where the sun may be very hot and scorching in summer and where frosts in winter may be severe. The natural soil of the garden is loam, both heavy and light.

G. Farreri.—This is not a difficult plant to grow in a light soil with quick drainage, but if it is to flower well a copious supply of water is essential. Cuttings of this Gentian taken in August and struck in sharp sand will make nice plants for the following year, but they do not appear to flower so well as plants raised from seed.

G. stragulata comes under the class of those which are difficult. It does not succeed here, possibly because I made an attempt to increase the number of my plants by dividing the old ones. It is described in the *Kew Bulletin* as "a splendid hardy species forming a dense carpet of many flowering rosettes." If obtainable, it would probably be best to try it in a mixture of peat and sand only.

G. Loderi promises to be a plant which can be grown without much difficulty in any light, porous soil. It has silvery-grey leaves and loose, trailing stems bearing terminal blue flowers, and should be an excellent plant for a pocket in the rock-garden or for the moraine,

where it is bound to attract attention when it becomes more widely known. Unfortunately some of the seedlings raised from it here are showing leaves which have no resemblance to the parent plant. Both *G. lagodechiana* and *G. Purdomii*, so called, were flowering at the same time as *G. Loderi*, and if the seedlings do not come true it is possible that the pollen of one or other of these plants had been carried to the flowers of *G. Loderi*.

G. rigescens presents no difficulties in cultivation provided the drainage is good and the plants receive an ample supply of water. It has grown and flowered here in a light, porous soil and in ordinary loam. It should have all the sun it can get, as it flowers late, not before October or even November. The plant as figured and described in the *Botanical Magazine*, t. 8974, has a stiff, upright, branching stem about 1 foot in height, with mauve flowers sometimes almost pink and varying considerably in colour. But among the plants raised from the Yunnan seed were plants similar in leaf and in the shape of the flower to the plant figured in the *Botanical Magazine*, but smaller in all their parts, with lax, decumbent stems carrying flowers of a delightful shade of light blue with a white throat. These latter are far more desirable than those which may be called the type-plants, and should be grown in preference to those plants.

G. prolata is not a difficult plant grown in light, well-drained soil. Its flowers are similar in type to those of *G. Farreri*, but much smaller; the colour being a pale light blue. Though it has little of the glory of Farrer's Gentian, *G. prolata* is a good plant, doing its best to make up for the smallness of its flowers by its freedom in flowering. It should be grown by all who are prepared to take a little trouble with it.

G. detonsa and *G. crinita* are biennials only, but very beautiful. Both can be grown in any well-drained soil which does not dry out. They have done well here, low down, in a dampish spot in full sun. Under such conditions *G. detonsa*, which produces seed very freely, should be planted in the hope that its owner may one spring find hundreds of seedlings coming up near the places where the plants flowered the previous year.

G. Kurroo is a plant which seems to vary considerably in the colour of its flowers. The earliest illustration of this Gentian appears in ROYLE's " Himalayan Plants," where the flowers are of a rich deep blue. In the year 1880 the plant was figured in the *Botanical Magazine*, t. 6470, where the flowers are shown as being light blue and much spotted. It must, I think, be assumed that the plant figured in the *Botanical Magazine* was the true *G. Kurroo*, as Sir J. HOOKER refers in his description of the plant in the text to Dr. ROYLE's earlier account. In all probability this Gentian was lost to cultivation after 1880 until about twenty-five years or so ago, when it was reintroduced by chance.

A mixed packet of seed collected by a friend was sent from Kashmir to Mr. H. C. BAKER, and among the plants raised from that was *G. Kurroo* with flowers of the deep blue shown in Dr. ROYLE's

illustration. These plants flourished in the heavy lias clay of Mr. BAKER'S garden at Almondsbury near Bristol for many years, but the war came, when there was no one to attend to even rare plants: they dwindled, and it is doubtful if there is even one left at the present time.

In the year 1928 or 1929 seeds of this Gentian were again sent to this country from Kashmir, and plants raised from that seed flowered last year. All these plants, so far as I am aware, have flowers of a light shade of blue, a trifle darker than that of the plant figured in the *Botanical Magazine*, and are not spotted. *G. Kurroo* is not a difficult plant in cultivation and should be in every garden where Gentians are grown. It requires sun and plenty of water when growing. FARRER tells us in his "English Rock Garden" that it should be planted "at the foot of a rock in the hottest and sunniest position in the garden in a soil which should be a deep rich and heavyish strong loam." In this garden, plants have grown in a light, porous soil and flowered well, though they are not so strong as plants in a heavy, well-drained loam.

It is possible that this Gentian may be a short-lived plant, and seed should be saved whenever it is possible to do so. Slugs are particularly fond of it and will destroy it entirely if they get the chance.

G. Waltonii is one of the very difficult Gentians. Its leaves are somewhat like those of *G. decumbens*, rather long and narrow, and its flowers are large and as beautiful a shade of blue as those of any Gentian. It hails from Tibet, where seed was collected by Captain KINGDON WARD a few years ago, so there ought not to be any question as to its hardiness. But in this country it seems to miss the deep blanket of snow which it gets in its own home during the winter, and does not appear to be able to stand the wet and dampness of our climate, with the result that it becomes a tender plant. It should, in any event, be covered with a sheet of glass in winter, and some dry bracken over the crown of the plant and under the glass acts as a protection from frost. This species is extremely well grown by Mr. F. W. MILLARD in his garden near Felbridge, in Sussex, where almost all Gentians grow and flourish under his skilful management. He tells me that he thinks the plant is hardy, and I would not venture to say he is wrong, but young plants in pots in a cold frame were killed here in the hard frost of February 1929.

G. ornata.—It is perhaps early times to say anything about the cultivation of this Gentian. Though it has been known to botanists from the dried specimens of WALLICH for over 110 years, it is only quite recently that the true plant, one of the many which we owe to Mr. HAY, has come into cultivation in this country. How many plants have been grown and exhibited during those 110 years, under the belief that they were the true *G. ornata*, it would be hard to say. Two have been figured in the *Botanical Magazine*, viz. t. 6514, the correct name of which is still in doubt, and t. 8140, which is, in fact, *G. Lawrencei*. Further, two distinct Gentians have received



FIG. 67. GENTIANA DINARICA AT CAMLA
(p. 184)

I face p. 180



Fig. 15 d
Mauna Kea (Hawaii)

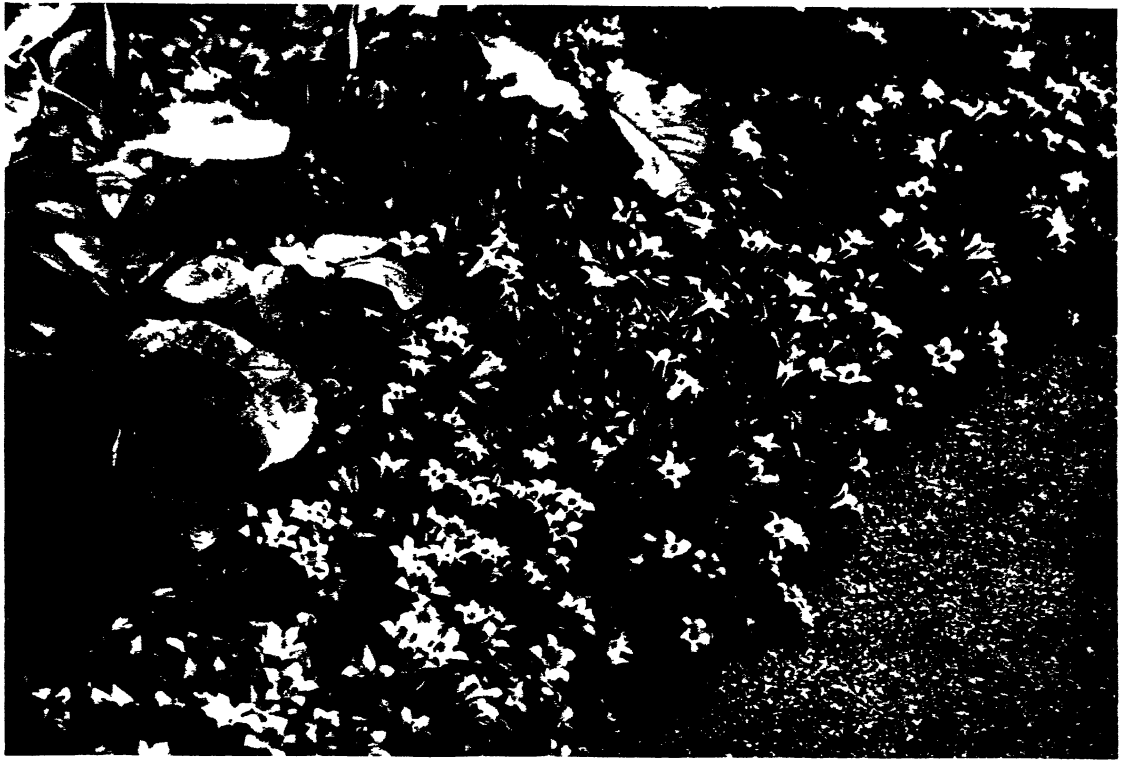


FIG. 73. GENTIANA PANNONICA AT CAMLA
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Awards of Merit under the name *G. ornata*: one shown in 1909 was, in fact, *G. Veitchiorum*, and the other shown in 1915 was *G. sino-ornata*.

The true *G. ornata* is a low-growing plant, sending out from a central rosette of small leaves many trailing stems, each bearing terminal light blue flowers which do not close on a dull day like those of *G. sino-ornata*. It seems to like a light, porous soil and appears to be quite hardy. At present it cannot be said that it is such an easy-going plant as *G. sino-ornata*, but it will probably not be difficult to grow under suitable conditions, and it is reported that plants have been successfully divided.

G. lutea is a plant which is easy to grow in any good, deep, rich soil, not, of course, in the rock-garden, but in the alpine meadow, or on the outskirts of the shrubbery leading down to the water or bog-garden. It is a handsome, stately plant, which does not always receive the appreciation which it really merits. It is slow-growing, but if rightly placed in a group of, say, a dozen plants, it may be left to look after itself for a year or two until one summer it will throw up its tall spikes of golden-yellow flowers in leafy tiers. When once established it must be left alone and cannot be moved, as it is a very deep-rooting plant.

G. Pneumonanthe is a British plant worthy of a place in any garden. It delights in a light, sandy, peaty soil, where it can get its roots down to moisture and is always in full sun. It is fairly common on the Dorset heaths, and until a few years ago was growing on a heather common in Surrey in a dampish spot. Whether it still remains, I cannot say.

The Central European or Styrian form of this Gentian is a finer plant in every way. Its deep blue flowers are larger, and they open more widely than those of our British plant. Further, it seems to be quite at home in any good garden soil where it has moisture and sun.

In the following lists I have attempted to classify those plants which I know, according to their difficulty or ease in cultivation. The lists represent my experience in this garden only, and I am well aware that they may not agree with the opinions or experience of others.

1. Impossibles.

G. ciliata
G. nivalis

2. Possible, but difficult.

G. trichotoma (*G. Hopei*)
G. Waltonii (may not be hardy)
G. stragulata
G. bavarica

3. Not difficult; but require care, suitable soil, and plenty of water when growing.

G. ornata
G. Veitchiorum
G. hexaphylla and its hybrid
G. calycosa
G. corymbifera
G. prolata
G. Kurroo
G. Parryi
G. Farreri and its hybrid
G. Loderi
G. detonsa
G. crinita
G. rigescens
G. verna
G. imbricata
G. pyrenaica

4. Easy.

(1) In suitable soil and position.

G. sino-ornata
G. Freyniana
G. decumbens
G. scabra var. *Buergeri*
G. Przewalskii
G. Pneumonanthe
G. Sceptrum
G. Andrewsii
G. Cruciata
G. lutea

(2) If planted in moist or shady position.

G. asclepiadea
G. Saponaria

(3) If planted where the roots can get down to moisture.

G. septemfida
G. lagodechiana
G. × *hascombensis*
G. Purdomii, so called

(4) Very generally, but will not flower freely everywhere.

G. acaulis

The majority of Gentians have flowers of such extraordinary beauty that it is rather disappointing to find that there are some species which cannot be recommended for any garden. They may be of interest to the botanist, but it can hardly be said that their flowers add any beauty to a garden. FARRER describes one of them as " ugly among the ugliest " ; another as of " quite singular worthlessness " ; while of the best of these unfortunates he says " needs and deserves no special care." They are mostly from Siberia and Turkestan, and three of them have come to this garden under the name *G. Kurroo* !

A list giving the names of those I know will be found below. It includes *G. picta*, a Chinese annual or biennial, which flowered here last year. It is a curious little upright, branching plant, about 8 or 10 inches high, giving the appearance of a tiny bush or shrub in miniature. Its flowers, the general colour of which is a pale yellow, are very small and inconspicuous. It would be quite possible for anyone who did not know the plant to pass it without any idea that it was flowering, and its proper place is in a botanic garden.

5. Easy, but worthless for beauty of flower.

G. brevidens
G. straminea
G. tibetica
G. Kesselringii
G. Grombczewskii
G. phlogifolia
G. picta

GENTIANS

AT CAMLA GARDENS, FELBRIDGE, EAST GRINSTEAD, SUSSEX.

By Mr. F. W. Millard.

Were I restricted to one family of plants I think I should select and centre on Gentians, for each and every one, with the exception of just a few, which have very leafy straggling growth and small blooms, is beautiful and interesting. There seems to be hardly any part of the world where Gentians of some kind are not to be found, and it is doubtful if all have yet been discovered and brought here. Unfortunately for wide cultivation, many appear to be obsessed with their own particular likes and dislikes, and the garden where all consent to flourish has yet to be found.

Some growers are fortunate enough to have alighted on a Gentian soil, a staple which without any addition suits many varieties, and they are indeed lucky, for it is impossible to decide that any particular soil will be to their liking till experience has settled that matter. As far as the south of England is concerned, most of the gardens where Gentians thrive are in the counties of Kent, Surrey, and Sussex, and I have a suspicion that the iron which in most of those gardens impregnates the soil is at least one explanation for Gentians flourishing as they do. If I am to be credited with any success in growing Gentians it is not altogether to be attributed to methods of cultivation, but to the fact that the soil of my garden is a Gentian soil. Many who observe far greater care do not succeed as well. The soil at Camla is a peaty, leafy loam, about eighteen inches of which overlays a very stiff, yellow subsoil which does not quickly dry out, and once the roots reach the subsoil they are safe from the effects of drought—a very important matter with Gentians. I am often asked what mixtures of soils are to be recommended for growing different Gentians, and reply to the best of my ability; but who can tell that the different soils I suggest contain the qualities of those used by me? In itself loam varies to a tremendous extent, so it is to be feared that what I recommend does not always afford the results expected.

In growing Gentians soil is a very important matter, and position only second to it. The soil at Camla contains not a vestige of lime, and as none has been added it cannot be, as so many authorities assert, essential to the well-being of any Gentian. Also, the soil here is naturally retentive of moisture. Experience has shown me that no Gentian, except two, can receive too much sun, granted that the roots are never allowed to become dry, the latter being most important. If moisture cannot be guaranteed I advise partial shade, but fine blooms and rich colour depend on sun.

My collection consists of some fifty species and many hybrids and sub-species, and among the hybrids are a few the parentage of which is impossible to define. Hybridization has proceeded at such a rate that Gentians are becoming as much involved as the Saxifrage family, and we hardly know where we are. Many of my Gentians seed about and grow freely in the most strange positions, and that by no means occurs in every garden.

We have lately succeeded in getting many species of American Gentians, and although some of them are beautiful enough, they do not equal and certainly do not surpass those of Asiatic origin; and they are not so easy to establish and grow. All these American species appear to be stringent lime-haters, and flourish only in a vegetable soil containing plenty of stone. One cause for congratulation is that all the Gentians I have attempted have proved thoroughly hardy, the most severe weather not harming them in the least. I should not care to plume myself on the fact that my ways of growing Gentians are the only ones which will succeed, as others meet with success under very different conditions, but these plants are not an accommodating family and are full of whims and fancies.

Gentiana acaulis is, perhaps, the most popular and widely grown of all, but is far from satisfactory everywhere, for it grows and spreads lustily where it refuses to bloom or only does so sparsely. Where it consents to flower the foliage is very different from elsewhere, being large and stout and leathery. I have long discarded the type for the variety *G. angustifolia*, for it is better in every way, and there is hardly a garden in which it will not bloom freely. No preparation of soil is necessary for it, and it cannot be placed wrongly, but be sure the right plant is obtained. Substitution is a fault of too many nurseries, chiefly through ignorance. The variations and sub-species of *G. acaulis* are almost endless, but *coelestina* is a charming one, and so is *alba* if it can be acquired true and not of a dirty white. I have at Camla a form given me by Mr. R. TROTTER, which has generally become known as *gigantea*. It is a wonderful thing, larger in all its parts than any other form of *G. acaulis*, and blooms on it have been measured over 4 inches across (fig. 66). However, its colour is not as brilliant as might be wished. It comes perfectly true from seed.

G. dinarica is another form of *G. acaulis*, and the real thing is all too rare in gardens. I believe it has only one station in Bosnia. The leafage is very tufty, and of a more vivid green than in most Gentians, while the bloom has the colour, and somewhat the form, of *G. sino-ornata*. No Gentian is more easy than this (fig. 67).

G. sino-ornata (fig. 68) is a veritable weed at Camla, and is to be seen in wide breadths, the soil and conditions evidently being ideal for it. It is never allowed to become dry. Usually, it succeeds in any fairly stiff soil, but resents lime. It is supposed to be a bog plant, and may be in its native habitat, but does not demand such conditions here. The finest piece I have has been established for some years in a sand-



Fig. 71. GENTIANA SEPTEMFIDA AT CAMLA
Sempervivum arachnoideum on the rock
(p. 186)



Fig. 7.—Gentiana Pneumonanthe at Camia
(p. 186)

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stone moraine in full sun, and although it fails to increase to the extent it does in soil it yields the finest blooms. Therefore, you need not despair of this Gentian if you have any limeless soil.

G. Farreri I could never grow to perfection till Mr. HARLEY, of Kirkcaldy, who has most of the Gentians flourishing like weeds, described to me the soil and conditions of his garden. Then I dug a hole low down to a depth of 2 feet, placed in the bottom 6 inches of drainage, and filled to the surface with a mixture half sandstone broken small and half leaf-mould and peat. This affords quick drainage, and the whole thing is deluged with water every day. In this *G. Farreri* remains beautifully green all the season, and when in bloom is a sight for the gods. I advise this method to be followed elsewhere, and feel certain it will succeed, but never forget this Gentian is as resentful of lime as *G. sino-ornata*.

G. Farreri has been a parent of several beautiful hybrids, one of the best of which has for its other parent *G. hexaphylla*. It blends the appearance of both, and has a lovely bloom somewhat resembling that of *G. Farreri*, of a more pronounced blue, with the additional merit of keeping expanded whatever the weather. It is an easy doer in the moraine mixture described above, and readily propagated by division. Mr. A. G. WEEKS, of Limpsfield, who deliberately crossed these two, deserves all congratulations on the plant he has produced. Another very beautiful hybrid is that between *G. Farreri* and *G. sino-ornata*, known as *G. Macaulayi*, Wells' variety. As I produced this, and so much has already been said concerning it, I will leave recognition of its merits to the many who are growing it this season. This hybrid appreciates the conditions under which *G. sino-ornata* flourishes.

G. hexaphylla is another beauty which may be described as a smaller *G. Farreri*, of very distinct foliage as it first appears through the soil in the spring, when it much resembles a Saxifrage. In the well-watered moraine with me it proves a veritable treasure.

G. prolata is another small *G. Farreri*, very tufty in growth, and has proved easy. Here it grows freely in ordinary soil and increases rapidly. It is evidently a plant for every garden where Gentians thrive.

G. verna (fig. 69) everyone admires and desires to have, but considering that it is a native it is not at all easy. Readers are advised to discard the true *G. verna* and grow *G. aestiva*, which is the Irish variety, much more amenable, and having a larger bloom with a more pronounced white centre. It throws out runners by means of which it is easily increased, and the true *verna* remains a close tuft. At the nurseries of Messrs. WELLS, Jun., of Merstham, Surrey, this gem is sown in the open soil, and the plants just spudded up as required for sale. If that firm can be persuaded to send readers soil at a reasonable price the problem of growing this treasure is solved for all. Here it grows well in the garden soil, but not as at Merstham. I would like to impress on readers one thing, and that is not to obtain mutilated, dug-up plants, but to secure seedlings or rooted cuttings having all their root system

intact. Wash out the roots and extend them in the soil to their full extent, and it is not difficult then to establish this Gentian. It is not a long-lived variety, and four years after planting the bed generally requires renewal and replanting.

A Gentian which has recently come to Camla is *G. Loderi*, which I am told was in England a good many years ago and was named after the late Sir EDMUND LODER. It has the unique feature of rather silvery foliage, and its blooms are a fine blue with a white throat. It is an outstanding plant of very neat growth, and thrives wonderfully in the moraine which suits *G. Farreri* so well. In a short time I hope to see this Gentian in every collection, as it is worthy of it. Seed being plentifully produced, it ought soon to be abundant and cheap.

G. lagodechiana (fig. 70) may be described as everyone's Gentian, for it grows in every conceivable position here, and approves equally of soil or moraine, and is even a success on the paths. Readers who fail with every other Gentian might turn to this one with confidence. It has afforded, crossed with *G. septemfida*, a very nice hybrid which partakes of the character of both parents, and this has been named by the raiser, Mr. MUSGRAVE, *G.* × *hascombensis*. This, too, is a very easy plant for all gardens, and, judging from the specimens I have seen in Major STERN'S garden at Highdown, it revels in lime.

G. septemfida (fig. 71) is another the requirements of which are very simply provided. It prefers loam, and a rather low and moist spot. Produced from seed, it varies a good deal as regards height, size of flower and intensity of the blue of the corolla. There is at Camla a form the blooms of which I am fond of asserting might be used as egg-cups, so large are they.

G. Cruciata is nice, and that is all that can be said about it, except that it is very easy. The clustered blooms are small.

Some difference of opinion exists as to what is the real *G. Purdomii* (fig. 72). At Camla it is represented by a vigorous grower, with long, dark green, strap-like foliage, from among which trails push out bearing blooms of a rich indigo blue. I believe it is true, and at any rate am very well satisfied with it. This I crossed with *G. Farreri*, and although a distinct thing resulted, it shows very little signs of *G. Farreri* blood.

G. Froelichii and *G. Freyniana* are very similar; both like moraine, and are difficult to obtain true from seed.

I must now describe a treasure I have lately acquired from New Zealand, this being the small *G. bellidifolia* (fig. 76), which, like all the family from that part of the world, is white, but a pure and lovely white. It develops a close mat of strap-like leaves of a reddish shade, and from this rise stems 4 inches high carrying many blooms which resemble stars when fully expanded. It is not at all like a Gentian, but is proving itself a good perennial. It is such a graceful little thing, and everyone falls in love with it, and as it has seeded well I hope soon to distribute it. September is its season of flowering, and for that reason it is doubly welcome to our gardens, especially as it is not fastidious.

The chief American Gentians at Camla are *G. Sceptrum*, *G. Menziesii*

(fig. 73), *G. Parryi*, *G. affinis*, *G. calycosa*, *G. Saponaria* (fig. 74), *G. setigera*, *G. linearis*, *G. glauca*, *G. oregana*, and six or seven others I have still to prove. All are doing well, both in moraine and soil of a limeless nature. *G. Saponaria* may be likened to a lower-growing *G. septemfida*, with Cambridge-blue flowers, and it is a real beauty of simple cultivation.

Regarding what is the true *G. Waltonii* (fig. 75) there are also differing opinions, but the authorities at Edinburgh pronounce that I have here the real plant. It develops a tuft of strap-like leaves with decumbent stems bearing, all the way up, blooms somewhat similar to those of *G. septemfida*, but of the most translucent deep blue, the colour being unequalled in its beauty. The plant is a late bloomer, and so far with me has not set seed.

G. Veitchiorum, although not a new introduction, has recently come into prominent notice, and may not appeal to all, as I think its colour somewhat dingy. It resembles *G. sino-ornata* in growth, and is prolific of both blooms and seed. This plant is easy in soil here.

G. stragulata is very attractive, but not at all easy. Its flowers are curiously constricted at the throat, and a fine colour. My limited experience of it denotes that it dislikes sun, and it is looking very vigorous growing in peaty soil in complete shade. *G. stragulata* is not simple to propagate, and I fear it will not soon become common in gardens.

G. sikkimensis is just good enough for inclusion in a collection, and is another species demanding shade, being liable to sudden and complete collapse if exposed to hot sun. It forms a very attractive and spreading mat, but the flowers are not outstanding.

The Gentians described do not include all I grow at Camla, as there are many concerning which I would prefer to ascertain a little more before venturing to suggest the best method of cultivation; and I think I have already inflicted my ideas on readers to an almost unpardonable extent.

[The figures of Gentians reproduced here are from photographs made by Mr. D. F. Merrett at Camla.]

THE CULTIVATED GENTIANS OF CHINA AND THE HIMALAYA.

By C. V. B. MARQUAND, M.A., F.L.S., Botanist, Royal Botanic Gardens, Kew.

MORE than two hundred species of Gentiana proper (= *Eu-Gentiana* Kusnezow) are known from China and the Himalaya, but only thirty-five of them have been ascertained to be in cultivation. Since these have been not a little confused in gardens, and among them are a number of plants which on account of their great beauty are much prized in horticulture, some account of them may be of service. A complete key and enumeration of the Chinese species with synonymy, but without descriptions, will be published elsewhere. Here only those species and varieties known to be in cultivation now, or in a few instances to have been grown at some time in the past and possibly still persisting in some gardens, are dealt with. A general key is supplied to all the species enumerated and a full description of each is given, together with references to illustrations. The reasons for reducing the genus Crawfurdia, as well as those for treating Gentianella as an independent genus (instead of as a subgenus of Gentiana), have been set forth in a paper entitled " New Asiatic Gentians : II " (published in the *Kew Bulletin*, 1931, pp. 68–88).

It has long been recognized that Gentiana is an exceedingly polymorphic genus, but in the author's opinion the advantages derived from dividing it by raising its sections to generic rank are quite outweighed by the disadvantages arising from the immense number of name changes which would be necessitated by this course.

In recent years several enthusiastic amateur gardeners have devoted their attention to crossing a number of species of this genus, with the result that not a few hybrids have arisen in cultivation. Most of the parents used belong to the Section Frigida, and particularly to series Ornatae and Verticillatae. Hybrids between members of these two highly critical series, such as *Gentiana Farreri* × *G. hexaphylla*, are now becoming well known. All those examined by the author exhibit characters unmistakably derived from both of their respective parents.

Probably on account of the reputed difficulty of cultivating and uncertainty of raising many of the species of this genus, they do not appear to have been made the subject of genetical research, and there is a most profitable field for investigation in this direction open to anyone possessing the necessary facilities. Similarly, the cytology of the genus does not seem to have been studied, not even the chromosome number being known for the Asiatic species.



FIG. 73.—GENTIANA MENZIESII AT CAMIA
(p. 186)

[*To face p.* 188



FIG. 74.—GENTIANA SATONARIA AT CAMIA
(p. 187)



FIG. 75 GENTIANA WALTONII AT CAMIA
(p. 187)



FIG 70.—GENTIANA BELLIDIFOLIA AT CAMLA
(p 186)

[*To face p* 189

The following have very kindly furnished lists of the Chinese and Himalayan species which they have in cultivation, and for these the author desires to express his gratitude:

Mr. J. W. Besant, Curator, Botanic Gardens, Glasnevin, Ireland.
Mr. F. J. Chittenden, formerly Director, Royal Horticultural Society Gardens, Wisley, Ripley, Surrey.
Dr. H. Handel-Mazzetti, Botanische Abteilung des Naturhistorischen Museums, Vienna.
Mr. A. Harley, Blinkbonney, Kirkcaldy, Fifeshire.
Mr. R. L. Harrow, formerly Curator, Royal Botanic Gardens, Edinburgh.
Professor H. Lecomte, Muséum d'Histoire Naturelle, Paris.
Dr. Lemperg, Hatzendorf, Styria, Austria.
Hon. H. D. McLaren, Bodnant, Tal-y-Cafn, N. Wales.
Mr. C. T. Musgrave, Hascombe Place, Godalming, Surrey.
Professor R. Pampanini, Mus. ed Ort. Bot., Via Lamarmora, Florence.
Major F. C. Stern, Highdown, Goring-by-Sea, Sussex.
Mr. A. G. Weeks, The Weald Cottage, Limpsfield, Surrey.

GENTIANA.

KEY TO THE CHINESE AND HIMALAYAN SECTIONS OF GENTIANA.

Plants of climbing habit, with distinctly twisted stems:

Seed winged (either surrounded by a discoid wing, or triquetrous, with one side shorter than the other two and all three edges winged) III. Dipterospermum (p. 191) (*G. Heleni*)

Seed not winged (triquetrous, with the three sides equal) IV. Tripterospermum (p. 192) (*G. Golowninia*)

Plants not climbing, stems not or scarcely twisted:

Corolla deeply lobed, with very short tube and small auriculate plicæ I. Otophora (p. 190) (*G. damyonensis*)

Corolla funnel-shaped, campanulate or tubular-clavate, with a longer tube (2–4 times as long as the lobes, seldom the same length); plicæ always conspicuously developed, though sometimes short.

Style very long, equalling the elongated ovary or somewhat shorter and gradually widening at the base; ovary many times longer than broad; capsule not rounded at the apex, and without wing-like appendages:

Plicæ asymmetrical, deeply cut off from the corolla-lobe on the right, as seen from within, fused with the corolla-lobe on the left; stem tetragonous; seeds winged II. Stenogyne (p. 191) (*G. pterocalyx*)

Plicæ symmetrical; corolla-lobes gradually attenuated into the tube; stem subterete; seeds not winged. VIII. Isomeria (p. 208)

Style short, sometimes absent, either conspicuously shorter than the ovary, or if equalling it (Sect. Chondrophylla), then the ovary is ellipsoid, and the capsule rounded at the apex with narrow wing-like antero-posterior appendages, which are attenuated into the base:

Seeds covered with membranous scales, which form hexagonal, honeycomb-like pits, or not scaly, but covered with hexagonal pits V. Frigida (p. 193)

Seeds not covered with membranous scales or hexagonal pits:

Seeds smooth or minutely rugulose, not winged:

Perennial:
Plants large, usually tall with erect or ascending stems, mostly with a terminal inflorescence; leaves large, usually linear-lanceolate or oblong-ovate; rhizome covered with a fibrous investment VI. Aptera (p. 203)

Plants small, usually forming mats; leaves small; rhizome not covered with a fibrous investment IX. Chondrophylla (p. 210)

Annual IX. Chondrophylla (p. 210)

Seeds with 1–3 wings . . . VII. Pneumonanthe (p. 207)

SECTION I. OTOPHORA.

Perennial. Stems cæspitose. Basal leaves linear-lanceolate. Cauline leaves rather lax. Flowers solitary, terminal. Calyx 5-lobed. Corolla divided to near the base into 5 lobes with a minute triangular subulate plica on one side of each lobe near the base. Style very short. Capsule subsessile. Seeds ovoid, with a small membranous wing at each end.

Four species belonging to this very distinct Section of the genus are known, but only one of these is in cultivation. They are all natives of south-west China.

1. **Gentiana damyonensis** Marquand in Kew Bull. 1928, 51.

Perennial, densely tufted and spreading from a rather small rootstock. *Barren stems* numerous, glabrous. *Flowering stems* fewer, glabrous, up to 9 cm. long. *Basal leaves* linear-lanceolate, 2–3·5 cm. long, 2·5–3·5 mm. wide. *Cauline leaves* few, sessile, linear-lanceolate with a subacute apex, 8–11 mm. long, 3 mm. wide. *Flowers* solitary, terminal, sessile, or shortly pedicellate. *Calyx* 3 mm. in diameter at the mouth; tube 4 mm. long; lobes erect, linear, acute, 2–3 mm. long, 0·5 mm. wide, each with one distinct nerve; sinus broad, subtruncate. *Corolla* more or less broadly tubular-campanulate, divided to near the base; lobes 5, lanceolate, subacute, 15–18 mm. long, 5–6 mm. wide, inside milky-white with a flush of dusky violet and a few violet spots, outer surface dusky violet; plicæ 5, minute, triangular-subulate, on one side of each lobe near the base. *Stamens* 5; filaments 12–14 mm. long, filiform, with a minute triangular pouch on the corolla-tube on each side of the point of attachment. *Ovary* subsessile; style very short. *Seeds* ovoid, with a small ring of hyaline cells at each end.

In alpine pastures at Damyon in south-west Szechwan, at an altitude of 16–17,000 ft., *Kingdon Ward* 5377.

SECTION II. STENOGYNE.

Perennials or annuals. Stems tetragonous, usually much branched. Cauline leaves thick, rigid, cordate-ovate or more or less ovate, with a scabrid, somewhat reflexed cartilaginous margin. Flowers solitary, terminal on the branches. Calyx most frequently winged and 5-lobed. Corolla with 5 lobes and large asymmetrical plicæ. Style very long. Capsule elongate. Seeds triquetrous, winged.

About twenty species belonging to this Section are known in herbaria. The majority are natives of the Chinese province Yunnan, but a few occur far outside this area, the range extending into the Malay Archipelago.

2. **Gentiana pterocalyx** Franch. ex Forbes et Hemsl. in Journ. Linn. Soc., Bot. xxvi. 132 (1890).

Annual. Stems erect or suberect, branched, up to 25 cm. high, more or less tetragonous, purplish. *Basal leaves* absent at the time of flowering. *Cauline leaves* sessile, increasing in size from the base to the apex of the stems, cordate-ovate, obtuse, up to 2·2 cm. long, 1·2 cm. wide; midrib and margin scabrid. *Flowers* solitary, sessile, terminal on the branches, erect or nodding. *Calyx* 5-winged; wings pilose; tube 12–15 mm. long, 6–7 mm. in diameter at the mouth; lobes 5, ovate-lanceolate, acute, 5–7 mm. long, 3–4 mm. wide at the base, margin scabrid; sinus acute. *Corolla* elongate-tubular, deep blue in the type; tube 3·5–5 cm. long, 6–7 mm. wide, with five longitudinal rows of short, whitish hairs; lobes 5, obovate, very short, 3–4 mm. wide; plicæ truncate, 3 mm. wide, margin erose. *Stamens* 5, unequal, 3 cm. long; filaments united to the corolla-tube to the middle, winged, recurved at the apex; anthers free, ovoid, 1·5 mm. long. *Ovary* subsessile; style long. *Capsule* not exserted. *Mature seeds* subovoid, somewhat compressed, surrounded by a narrow wing.

On the mountains of north-western Yunnan, at an altitude of 10–12,000 ft.

A yellow-flowered variety has been collected by the late Mr. G. Forrest, at an altitude of 13,000 ft. in open woods on the south side of the snow-covered mountains near Lichiang.

SECTION III. DIPTEROSPERMUM.

Perennial. Stems climbing. Leaves with distinct and usually long petioles. Flowers large. Calyx tubular. Corolla 5-lobed, plicæ short. Capsule subsessile, dry, dehiscent. Style long. Seeds discoid, broadly winged.

This Section, together with the next, has long been made to comprise a separate genus, Crawfurdia—an unnatural classification depending upon the climbing habit.

3. **Gentiana Helenі** Marquand in Kew Bull. 1931, 69.

ILLUSTRATION. Notes Roy. Bot. Gard. Edin. iv. t. 16 (1907) (as *Crawfurdia Trailliana*).

Perennial. Stems climbing, attaining a height of 6 m., tetragonous, purplish. *Leaves* broadly oblong or elliptic, acuminate or subacuminate, paler on the under surface, 5–7 cm. long, 2–3 cm. wide; petiole 5–8 mm. long. *Flowers* large, solitary, or two together in the axils of the leaves on long (but very variable in length), slender pedicels. *Calyx* ultimately dimidiate-spathaceous, with 5 deltoid, acute, recurved lobes. *Corolla* tubular-campanulate, 7 cm. long; lobes triangular-ovate, acute, 15–17 mm. long, 11–12 mm. wide. Stamens 5; filaments subulate, winged, upper 1·5–1·8 cm. free from corolla-tube; anthers 5 mm. long. *Capsule* elongate; style about 2·5 cm. long, bifid to the middle. *Seeds* rather large, surrounded by a discoid wing.

This beautiful species was introduced by the late Mr. GEORGE FORREST when on his first expedition to north-west Yunnan in November 1905. It has subsequently been collected a number of times in shady situations in the side valleys of the Salween-Irrawaddy divide, where it is said to form a distinct belt between 5,000 and 7,000 ft. in altitude.

SECTION IV. TRIPTEROSPERMUM.

Perennial. Stems climbing. Leaves petiolate. Flowers large, axillary. Calyx tubular. Corolla 5-lobed, plicæ short. Ovary becoming more or less succulent and long-stipitate. Seeds trigonous, scarcely winged.

This and the previous Section together constituted the genus Crawfurdia, which is here reduced.

4. **Gentiana Golowninia** Marquand in Kew Bull. 1931, 70.

ILLUSTRATION. Useful Pl. Jap. iii. t. 881 (1891) (as *Crawfurdia japonica*).

Perennial. Stems climbing, spirally twisted, terete, dark purple. *Internodes* 8–12 cm. long. *Cauline leaves* cordate-ovate, acute or acuminate, 3-nerved, 6–8 cm. long, 2·5–4 cm. wide; petioles up to 1 cm. long, narrowly winged. *Flowers* fasciculate, subsessile or shortly pedicellate. *Bracts* resembling the foliage leaves but much smaller. *Calyx* tubular-campanulate, tinged with purple; tube 6–8 mm. long, 4–5 mm. in diameter at the mouth; lobes 5, equal, acuminate, 8–10 mm. long, 2·5 mm. wide at the base; sinus rounded. *Corolla* tubular-clavate, whitish; tube 2·5 cm. long, 1 cm. in diameter at the mouth; lobes 5, ovate, acute, 3·5–4 mm. long, 3–4 mm. wide; plicæ short, subtruncate, 3–3·5 mm. wide. *Stamens* 5, 2–2·5 cm. long; filaments subulate, scarcely winged, united to the corolla to half their length; anthers free, ellipsoid, 1 mm. long. *Ovary* ovoid, stipitate; style 5–7 mm. long. *Fruit* fleshy, ellipsoid or subglobose, 1·5 cm. long, red, partly or wholly exserted from the corolla by the elongation of the stipe. *Mature seed* triquetrous, 2 mm. long, 1·5 mm. wide, dark brown.

In forests in Japan.

SECTION V. FRIGIDA.

Perennial or rarely annual. Stems cæspitose, ascending. Basal leaves, when present, usually linear or linear-lanceolate. Cauline leaves frequently with a narrow cartilaginous margin. Calyx entire, 4- or 5-lobed. Corolla with 4 or 5 lobes and asymmetrical plicæ, which are usually unilaterally auriculate. Capsule stipitate, exserted, or included in the corolla. Seeds covered with a membrane forming honeycomb-like pits.

This Section includes a number of species which are extensively cultivated on account of the beauty and abundance of their flowers. Many species, particularly in the Ornata Series, are highly critical, and numerous hybrids are known; a few putative hybrids have been found in the wild state.

In the Ornata Series a number of varieties of *G. Veitchiorum* and other species are known. The genetic relation of these has yet to be worked out.

KEY TO SPECIES OF THE SECTION FRIGIDA.

Leaves in whorls (Series Verticillatae):
- Leaves entirely glabrous 5. *hexaphylla* (p. 194)
- Leaves with stiff hairs around the margins . . 6. *setulifolia* (p. 194)

Leaves in pairs:
- Plant perennial:
 - Flowers solitary, terminal:
 - Leaves narrow, linear or lanceolate, acute, never obovate; corolla not narrowed at the throat when fully expanded:
 - Cauline leaves 1–5 mm. wide, not imbricate (Series Ornatae):
 - Rosette leaves present, linear or linear-lanceolate:
 - Corolla narrowly funnel-shaped, 4·5–5·5 cm. long; lobes deep royal blue; anthers 2·5–3 mm. long . . 7. *Veitchiorum* (p. 195)
 - Corolla tubular-clavate, somewhat expanded upwards, 3·5–4 cm. long, blue-purple; anthers about 1·5 mm. long . 8. *prolata* (p. 196)
 - Rosette-leaves absent:
 - Plant very small; stems scarcely 5 mm. long; flowers up to 2·8 cm. long . 12. *namlaensis* (p. 198)
 - Plant larger; stems much longer; flowers 3–7 cm. long:
 - Flowers pedicellate, light blue with a white or pale blue and white throat;
 - Corolla campanulate . . 9. *ornata* (p. 196)
 - Corolla funnel-shaped:
 - Upper leaves strongly recurved, about 2 mm. wide at the base; calyx-tube 2 cm. long; corolla-lobes obtuse 13. *Farreri* (p. 198)
 - Upper leaves not recurved, about 1 mm. wide at the base; calyx-tube about 1 cm. long; corolla-lobes subapiculate 11. *Lawrencei* (p. 197)

Flowers sessile, deep blue with a dark pure blue throat . . . 10. *sino-ornata* (p. 197)
Cauline leaves up to 1 cm. wide, densely imbricate throughout the stem . . . 14. *Georgei* (p. 199)
Leaves obovate, attenuate at the base, corolla narrowed at the throat when fully expanded . . 15. *stragulata* (p. 200)
Flowers several:
Flowers densely aggregated; inflorescence capitate:
Calyx-tube campanulate . . . 17. *rigescens* (p. 201)
Calyx-tube dimidiate-spathaceous . 16. *sikkimensis* (p. 200)
Flowers not densely aggregated or few:
Flowers pedicellate, ternate; corolla deep blue; leaves attenuate at the base . . 18. *trichotoma* (p. 201)
Flowers sessile or subsessile; corolla whitish; leaves not attenuate at the base . 19. *Przewalskii* (p. 202)
Plant annual:
Calyx always 4-partite, strongly keeled . . 20. *praeclara* (p. 202)
Calyx usually 5-partite, not keeled . . . 21. *picta* (p. 203)

5. **Gentiana hexaphylla** Maxim. ex Kusnez. in Bull. Acad. Sci. St. Pétersb. xxxv. 349 (1894).

ILLUSTRATION. *Loc. cit.*, t. versus p. 352, figs. 31–34 (1894).

Perennial. Stems decumbent, up to 18 cm. long. *Basal leaves* none. *Cauline leaves* in whorls of six, linear or linear-spathulate, obtuse, increasing in length from the base towards the apex of the stem, up to 1 cm. long, 4 mm. wide, all united at the base to form a sheath. *Flowers* solitary, terminal, sessile. *Calyx* partly hidden by the uppermost leaves; tube entire; lobes 6, linear-spathulate, obtuse, mucronate, 7–10 mm. long, 3–4 mm. wide. *Corolla* funnel-shaped, somewhat expanded above the level of the calyx-tube, blue, spotted with green; tube 4–4·5 cm. long, 1·5 cm. in diameter at the mouth; lobes usually 6, broadly ovate, obtuse, mucronate, 3–4 mm. long, 5 mm. wide; plicæ much shorter than the lobes, 3 mm. wide, truncate or more or less triangular with a crenulate margin. *Stamens* usually 6, 3 cm. long; filaments linear, subulate, united to the corolla-tube for the lower 2 cm.; anthers free, linear-oblong, 2–2·5 mm. long. *Ovary* oblong-fusiform, stipitate; style short. *Capsule* exserted on a long stipe. *Mature seeds* not seen.

Western Szechwan, extending to the plateau of Eastern Tibet.

6. **Gentiana setulifolia** Marquand in Kew Bull. 1928, 56.

ILLUSTRATION. Hook. Ic. Plant t. 3162.

Perennial, somewhat creeping. *Barren stems* numerous, short. *Flowering stems* erect, scabrid, 10–15 cm. high, with internodes 2–4 mm. long. *Rosette leaves* none. *Cauline leaves* 7-verticillate, sessile, patent, linear, acuminate, increasing in size towards the apex of the stems, up to 9 mm. long, 0·5–1 mm. wide; margin with distinct stiff subulate hyaline setæ; leaves of the upper whorls surrounding the calyx. *Flowers* large, solitary, terminal, sessile. *Calyx* purplish;

tube 7–9 mm. long, 5–6 mm. wide; lobes 7–8, linear, acuminate, 6–8 mm. long, 0·5–0·7 mm. wide, with stiff hyaline setæ on the margin; sinus rather broad, obtuse. *Corolla* campanulate funnel-shaped, "sea-blue, tube striped blue on a whitish ground," 4·0–4·5 cm. long, 1·5 cm. wide at the mouth of the tube; lobes 7–8, more rarely only 6, ovate, acuminate or very shortly cuspidate, 5 mm. long, 4 mm. wide, margin minutely erose; plicæ short, laciniate. *Stamens* equalling the lobes in number, about ¾ the length of the corolla-tube; anthers oblong, 3–3·5 mm. long. *Ovary* stipitate. *Ripe seed* not seen.

On the frontier of Burma and Tibet. Valley of the Seinghku, 28° 10′ N., 97° 20′ E., 12–13,000 ft. alt., Oct. 13, 1926. *F. Kingdon Ward* with 7385. On granite slabs in shelter under cliffs, but in the open. Valley of the Seinghku, 10,000 ft. alt., *F. Kingdon Ward* 7485.

This species has been reported by Capt. F. KINGDON WARD from the same altitude in an unspecified locality in 1931, whence seeds have been received in this country. It is said to grow as a mat plant forming large colonies in sunny places.

7. **Gentiana Veitchiorum** Hemsl. in Gard. Chron., Ser. III. xlvi. 178, fig. 74 (1909).

ILLUSTRATION. Bot. Mag. t. 8883.

Perennial, with thick fibrous roots. *Stems* several, trailing, up to 10 cm. long, or occasionally more, glabrous or slightly puberulous; internodes up to 15 mm. long, more or less tinged with red. *Basal leaves* forming a central rosette, up to 10 in number, sessile, linear-oblong, obtuse or subacute, 2·5–4 cm. long, 4–6 mm. wide, covered with whitish papillæ on both surfaces, dark green above, paler below; margin more or less minutely scaberulous; midrib slightly raised below, lateral nerves rather obscure. *Cauline* leaves opposite, linear-oblong to elliptic, apex acute or subobtuse, sometimes more or less mucronate, 6–8 mm. long, 2·5–4 mm. wide; petioles very short; leaf-sheaths connate, 3–4 mm. long. *Flowers* solitary, terminal, erect or nearly so on very short pedicels (up to 2 mm. long). *Calyx* narrowly funnel-shaped; tube 1·2–1·6 cm. long, 4–5 mm. in diameter, green more or less tinged with red; lobes 5, linear-lanceolate, acute, apiculate, rather variable in size but averaging 1 cm. long, 2 mm. wide. *Corolla* narrowly funnel-shaped; tube 4·5–5·5 cm. long, 3 cm. in diameter at the mouth, basal portion within the calyx greenish-yellow, this colour extending upwards into the lobes as 5 broad greenish-yellow bands, each band traversed along the middle by a purple line and edged on each side by a broader purple band; the areas below the plicæ blue-purple outside; lobes 5, broadly triangular, subacute, apiculate, 6–7 mm. long, deep royal-blue inside (inside of corolla-tube with or without purple antipetaline spots); plicæ very

shortly and broadly triangular, obtuse, erose, 2–2·5 mm. long, 5 mm. wide, paler blue than the lobes. *Stamens* inserted about 2·5 cm. from the base of the corolla; filaments subulate, 12 mm. long, glabrous; anthers 2·5–3 mm. long. *Ovary* stipitate, about 1·4 cm. long, narrowed into the style and stipe; style 6 mm. long, stipe 2·5–3 mm. long. *Seeds* ovoid, covered with a membrane forming hexagonal pits.

Mountains of Western Szechwan and the adjoining parts of Eastern Tibet and Northern Yunnan.

8. **Gentiana prolata** Balf. fil. in Trans. & Proc. Bot. Soc. Edin. xxvii. 266 (1918).

Perennial, with rather thick and fleshy, much-branched roots. *Stems* up to 20 cm. long, prostrate, but not rooting below, ascending above. *Basal leaves* none. *Cauline leaves* connate in pairs, increasing in size from the base towards the apex of the stems, elliptic-lanceolate or oblong, 4–15 mm. long, 2–5 mm. wide, apex obtuse, shortly mucronate. *Flowers* solitary, terminal, sessile. *Calyx* reddish outside; tube entire, 1 cm. long; lobes 5, nearly equal, oblong, acute, shortly apiculate, 5–7 mm. long, 1·5 mm. wide. *Corolla* clavate, somewhat expanded upwards; tube 3·5–4 cm. long, blue-purple and yellowish with five purple antipetaline bands; lobes 5, broadly triangular or ovate, subapiculate, 3 mm. long, 3–3·5 mm. wide; plicæ much shorter than the lobes, 2–2·5 mm. wide, somewhat erose and apiculate. *Stamens* 5, 2·5 cm. long, upper third free from the corolla-tube; filaments narrowly winged, purplish; anthers sagittate, about 1·5 mm. long. *Ovary* fusiform, stipitate; style rather short; stipe 2 cm. long. *Capsule* becoming exserted from the corolla by the elongation of the stipe. *Mature seeds* ovoid, 1 mm. long, 0·5 mm. wide, pale brown, alveolate.

Sikkim and Bhutan. This species was raised from seed towards the end of last century and grown under the mistaken name *G. ornata*, and re-introduced by Mr. Cooper in 1914 from Parsheng, Timpu, at an altitude of 14,000 ft. in Bhutan.

9. **Gentiana ornata** Wall. ex Griseb. Gen. et sp. Gent. 277 (1839).

Illustration. Gard. Chron., Ser. III. lxxxviii 235 (1930).

Perennial, with a very short rhizome. *Stems* short, numerous, ascending at the apex, rather slender. *Basal leaves* forming a rosette, linear, acute, up to 2·5 cm. long, 2 mm. wide, connate at the base. *Cauline leaves* in pairs, increasing in size towards the upper part of the stem, those at the base elliptic, 4 mm. long, 2 mm. wide; those above linear-lanceolate, acute, up to 13 mm. long, 3 mm. wide, attenuate into a membranous leaf-sheath 3 mm. long. *Flowers* terminal, solitary, sessile. *Calyx* frequently purplish; tube 12–15 mm. long; lobes 5, narrow linear, acute, 1–1·2 cm. long, 1–2 mm. wide. *Corolla*

campanulate, pale blue; tube somewhat expanded above the level of the calyx, 3–4 cm. long; lobes 5, broadly triangular or ovate, 3–5 mm. long, 3·5–5 mm. wide; plicæ deltoid, usually bifid, margin erose, 6 mm. wide, much shorter than the lobes. *Stamens* 5, filaments narrowly winged, upper 12 mm. free; anthers sagittate, 2·5 mm. long. *Ovary* fusiform, long-stipitate. *Mature seeds* not seen.

On the Himalaya in Nepal. This species, which has been known from herbarium material for a century, has only recently been introduced to cultivation. Several distinct species belonging to this critical Series have been confused with it in the literature.

10. **Gentiana sino-ornata** Balf. fil. in Trans. & Proc. Bot. Soc. Edin. xxvii. 253 (1918).

ILLUSTRATION. Bot. Mag. t. 9241 (1928).

Perennial, with a very short rhizome. *Stems* rather numerous, prostrate at the base, ascending at the apex, rather slender, up to 20 cm. long; internodes frequently purplish. *Basal* leaves forming a rosette, linear-lanceolate, acute, up to 2·5 cm. long, 3 mm. wide, connate at the base. *Cauline leaves* increasing in size from the base to the apex of the stem, up to 3·5 cm. long, 5 mm. wide, linear-lanceolate, attenuate to an acute apex, straight. *Flowers* solitary, terminal, subsessile. *Calyx* partly hidden by the uppermost leaves; tube 10–12 mm. long, 4 mm. in diameter at the mouth; lobes 5, resembling the leaves, up to 2 cm. long, 2·5 mm. wide. *Corolla* tubular-funnel-shaped, 3 cm. in diameter when expanded, deep blue; tube up to 6 cm. long, narrow, basal portion within the calyx-tube yellowish-white, which colour extends up as 5 broad antipetaline bands which are irregularly tinged with purple; lobes 5, broadly ovate, acute, apiculate, 8 mm. long, 7 mm. wide, usually royal blue inside, striped with the antipetaline bands outside; plicæ somewhat oblique, broadly triangular, obtuse, 3–4 mm. long, 6–7 mm. wide, margin entire or somewhat erose. *Stamens* inserted about 2·5 cm. from the base of the corolla; filaments subulate, 1 cm. long, narrowly winged; anthers sagittate, about 2·5 mm. long. *Ovary* stipitate, 1·5 cm. long, narrowed into the style and stipe; style 6–7 mm. long, stipe 2·5 mm. long. *Mature seeds* not seen.

On the mountains of north-western Yunnan.

This species has been crossed with *G. Farreri* and other species of Sect. Frigida.

11. **Gentiana Lawrencei** Burkill, in Gard. Chron., Ser. III. xxxviii. 307 (1905).

ILLUSTRATIONS. *Loc. cit.*; Bot. Mag. t. 8140 (1907), as *G. ornata*.

Perennial. *Stems* up to 15 cm. long, 1 mm. in diameter, prostrate at the base and rooting at the nodes, branching above, branches

ascending. *Basal leaves* disappearing at the time of flowering. *Cauline leaves* linear-lanceolate, acute, recurved, 1·5–2·5 cm. long, 1–1·5 mm. wide. *Flowers* solitary, terminal, pedicellate; pedicels 1–3 cm. long, purple-tinged above. *Calyx-tube* entire, 12–13 mm. long, 3·5 mm. in diameter at the mouth; lobes 5, linear, acute, 1·5–2 cm. long. *Corolla* tubular-clavate or obconoid-tubular; tube 4·5–5 cm. long, 1·5 cm. in diameter at the mouth; within the calyx pale green, above that level with 5 antipetaline greenish-white bands, interpetaline areas white tinged with pale sky-blue and the throat striped blue and white; lobes 5, broadly ovate, obtuse, shortly apiculate, 6–7 mm. long, 5–6 mm. wide, pale sky-blue; plicæ broadly triangular, somewhat erose, very short, 6–7 mm. wide, paler than the lobes. *Stamens* inserted about 2 cm. from the base of the corolla; filaments subulate, 1 cm. long, glabrous; anthers 2 mm. long, 0·5 mm. wide. *Ovary* stipitate, about 1 cm. long, narrowed into the style and stipe; style 4 mm. long; stipe 1·5 cm. long. *Mature seeds* not seen.

First described from plants raised from Siberian seed, collected in the neighbourhood of Lake Baikal; this species has subsequently been found to have a wider distribution in a southern direction.

12. **Gentiana namlaënsis** Marquand in Journ. Linn. Soc., Bot. xlviii. 205 (1929).

Perennial. Stems cæspitose, forming extensive mats. *Basal leaves* forming rosettes of sterile shoots, narrowly linear-oblong, subacute, 2–2·5 cm. long, 2–3·5 mm. wide. *Cauline leaves* few, linear-lanceolate, subacute, pale green, 1–1·2 cm. long, 2–2·5 mm. wide. *Flowering branches* extremely short, erect, scarcely 5 mm. long. *Flowers* solitary, terminal, sessile. *Calyx* hidden by the upper cauline leaves; tube subcampanulate, 7–8 mm. long, lobes 5, slightly unequal, narrowly triangular acute, about 6 mm. long, 3 mm. wide. *Corolla* campanulate-cylindrical, 2·2–2·8 cm. long, 7–8 mm. wide, pale blue; lobes 5, subdeltoid, obtuse, 3–3·5 mm. long, 3 mm. wide; plicæ subtruncate, narrower than the lobes. *Stamens* united to the corolla-tube along the basal 6 mm. of the filaments; upper 8 mm. of the filaments free. *Ovary* stipitate, capitate; style 3–4 mm. long. *Mature seeds* not seen.

On alpine slopes among creeping willows, etc., on the Nam La, S.E. Tibet, at an altitude of 15,000 ft., *Kingdon Ward* 6025.

13. **Gentiana Farreri** Balf. fil. in Trans. and Proc. Bot. Soc. Edin. xxvii. 248 (1918).

ILLUSTRATION. Bot. Mag. t. 8874–8875.

Perennial, with a central rosette of leaves from which arise many branching stems. *Stems* up to 20 cm. long, prostrate, ascending towards

the apex. *Basal leaves* forming a central rosette, rather numerous, linear-lanceolate, resembling those on the branches. *Cauline leaves* opposite, in pairs, connate at the base, forming a vaginal sheath up to 5 mm. long; blade 2–4 cm. long, 2 mm. wide, more or less clothed with whitish papillæ on both sides. *Flowers* solitary, terminal, erect or suberect, on a pedicel up to 1·5 cm. long, or more rarely subsessile. *Calyx* narrowly funnel-shaped; tube glabrous, 1–1·5 cm. long, about 5 mm. in diameter, green tinged with red at the base; lobes 5, linear, acuminate, lax and somewhat spreading, up to and sometimes exceeding 3 cm. long, about 1·5 mm. wide. *Corolla* narrowly funnel-shaped; tube 4–5 cm. long, up to 2 cm. in diameter at the mouth, greenish-white at base within calyx, spreading upwards as five broad antipetaline yellowish bands, each band traversed along the middle by a narrow greenish line and edged each side by a similar but rather broader band, interpetaline areas whitish-blue; lobes 5, broadly ovate, apiculate, about 8 mm. long, recurving, bright pale blue; inside of tube covered with small, scattered, greenish antipetaline spots; plicæ very shortly triangular, obtuse, sometimes emarginate, about 3 mm. long, 8 mm. broad. *Stamens* 5; filaments narrowly winged, white inside, deep purple outside, free for the uppermost 9 mm.; anthers sagittate, about 3 mm. long. *Ovary* stipitate, about 1·5 cm. long, attenuate below into a stalk 3 mm. long, and attentuate above into the style, which is some 7 mm. long, including the two recurved arms bearing the stigmatic surface.

Mountains in north-western China, particularly in Western Kansu, and in the adjacent portion of Tibet.

14. **Gentiana Georgei** Diels in Notes Roy. Bot. Gard. Edin. v. 221 (1912).

Perennial. Stems ascending, 5–7·5 cm. high. *Basal leaves* of the sterile shoots lanceolate, up to 6 cm. long, 8–10 mm. wide. *Cauline leaves* imbricate and frequently tinged with purple, lanceolate, up to 4 cm. long, 1 cm. wide, margin densely papillose. *Flowers* terminal, solitary, sessile. *Calyx-tube* more or less hyaline, 2–2·5 cm. long; lobes 5, lanceolate, 1–1·5 cm. long, purple-tinged, midrib and margins papillose; sinus truncate. *Corolla* elongate-campanulate, up to 6 cm. long, purplish-blue with greenish stripes on the outside, tinged with green below; tube 4–5 cm. long, 2–2·5 cm. wide at the mouth; lobes 5, broadly triangular, subacute, 8 mm. long, 7–8 mm. wide; plicæ triangular, 4–5 mm. long, 7–8 mm. wide. *Stamens* 5, shorter than the corolla tube. *Ovary* stipitate, 1·5–2 cm. long; style 10–12 mm. long; stipe 6–7 mm. long. *Mature seeds* not seen.

North-west Yunnan; on open mountain meadows at an altitude of 1,100–1,200 ft. First found by the late Mr. GEORGE FORREST on the eastern flank of the Lichiang Range.

15. **Gentiana strangulata** Balf. fil. et Forrest apud Marquand in Kew Bull. 1928, 61.

ILLUSTRATION. Bot. Mag. t. 8897.

Perennial, prostrate. *Stems* numerous, more or less decumbent, numerous. *Rosette leaves* obovate, attenuate at the base into a wide petiole, up to 2 cm. long, 7 mm. wide. *Cauline leaves* connate in pairs, oval, rotundate at the apex and attenuate below into the petiole, margin frequently bearing reddish glands, upper surface shining, pale green, glandular, lower surface paler. *Flowers* 1–3 together at the apex of the branches, terminal flower sessile, two lateral flowers usually pedicellate. *Calyx* funnel-shaped, glandular, 2·5 cm. long, purple-tinged, striped and spotted with purple; lobes 5, equalling the tube, ovate, acute, resembling the leaves. *Corolla-tube* spindle-shaped, up to 5·5 cm. long, narrowed at the purple-coloured throat, purplish-blue outside; lobes 5, triangular, 5–7 mm. long, 5–6 mm. wide at the base, blue, spotted at the base; plicæ erose, lobate, or more or less bifid at the apex, 2 mm. long, whitish. *Stamens* a little shorter than the corolla-tube; filaments subulate; anthers free, small. *Ovary* stipitate, attenuate at the apex and base; stipe narrow, about equalling the ovary in length. *Style* 8 mm. long, slightly exceeding the corolla-tube. *Stigmatic lobes* recurved. *Capsule* slightly exserted. *Mature seed* rugose with lamellæ.

North-western Yunnan and the south-eastern Tibetan borders.

16. **Gentiana sikkimensis** C. B. Clarke in Hook. fil. Fl. Brit. Ind. iv. 114 (1883).

ILLUSTRATION. Bull. Acad. Pétersb. xxxv. 352, figs. 43–45 (1894).

Perennial. *Stems* several, decumbent, up to 20 cm. long. *Basal leaves* orbicular or elliptic, obtuse, 12–15 mm. long, 10–12 mm. wide; petiole very short. *Cauline leaves* elliptic or oblong, up to 3 cm. long, the uppermost surrounding the inflorescence. *Internodes* long. *Flowers* several to rather numerous, capitate. *Calyx* partly hidden by the uppermost leaves; tube dimidiate-spathaceous, 8–10 mm. long, 3–5 mm. in diameter at the mouth; lobes 5, frequently unequal, resembling the leaves, 5–7 mm. long, 2–3 mm. wide, commonly 2 elliptic, and 3 linear. *Corolla* tubular-clavate, not contracted at the mouth, blue; tube 2–2·5 cm. long, 5–6 mm. in diameter; lobes 5, short, ovate, subacute; plicæ asymmetrical, bifid, much shorter than the lobes. *Stamens* 5, shorter than the corolla-tube to which they are attached at the base; filaments subulate, not winged; anthers free, 2 mm. long. *Ovary* elliptic-oblong, stipitate; style rather short; stipe 6–10 mm. long. *Capsule* exserted from the corolla-tube by the elongation of the stipe. *Mature seed* subglobose, rugose, covered with lamellæ.

Ranging from Sikkim to north-western Yunnan, at an altitude of 12–15,000 ft.

17. **Gentiana rigescens** Franch. ex Hemsl. in Journ. Linn. Soc., Bot. xxvi. 134 (1890).

ILLUSTRATION. Bot. Mag. t. 8974.

Perennial. Stems erect up to 30 cm. high, rather stout, rigid, terete, most frequently purple-tinged. *Lower leaves* minute, orbicular, 2–4 mm. long, gradually increasing in size towards the middle of the stem. *Cauline leaves* in pairs, faintly 3-nerved, ovate-oblong, 2–5 cm. long, 7–15 mm. wide, apex subobtuse, base attenuate and more or less connate in a narrow sheath. *Flowers* terminal, up to 14 in number, most frequently densely capitate. *Calyx* membranaceous; tube campanulate, 9–10 mm. long, 4–5 mm. in diameter at the mouth; lobes 5, somewhat unequal, linear to oblong-lanceolate, 2–7 mm. long, 1·5–3 mm. wide. *Corolla* tubular-funnel-shaped, purplish-blue spotted with minute green dots; tube 2·5 cm. long, 1 cm. in diameter at the mouth; lobes 5, broadly ovate, abruptly acuminate, 5 mm. long, 4 mm. wide; plicæ very oblique, less than half the length of the lobes. *Stamens* 5, equal, shorter than the corolla-tube to which they are united to midway; anthers oblong, 2·5–3 mm. long. *Ovary* narrowly cylindrical, stipitate, 2 cm. long, stigma shortly bifid. *Mature seed* fusiform-oblong, brown, foveolate, 0·7–0·8 mm. long.

On mountains in Western Yunnan, principally between the altitudes of 8,000 and 11,000 ft. on the Lichiang and Tali Ranges, and in the neighbourhood of Tengyueh and Szemao.

18. **Gentiana trichotoma** Kusnez. in Act. Hort. Petrop. xiii. 61 (1893).

ILLUSTRATION. Gard. Chron., Ser. III. lxxiii. fig. 156, p. 323 (1923), as *G. Hopei* Hort., nomen nudum: New Flora and Silva, iv. fig. lxxv (1932).

Perennial. Stems up to 40 cm. high, erect or ascending, frequently dark purple. *Basal leaves* of the barren stems linear-lanceolate, subacute, up to 12 cm. long, 7–9 mm. wide. *Cauline leaves* oblong-lanceolate or spathulate-lanceolate, up to 6 cm. long, 1·5 cm. wide. *Flowers* pedunculate, usually 3 together at the uppermost nodes forming a lax raceme, rarely also from some of the lower nodes. *Calyx* tubular, purple-tinged; tube 6–8 mm. long, 3·5–4 mm. in diameter at the mouth; lobes 5, somewhat unequal, linear or linear-lanceolate, subacute, 3–5 mm. long, 1–2 mm. wide. *Corolla* clavate-cylindrical, deep dark blue; tube 2·5–5 cm. long, scarcely 1 cm. in diameter at the mouth, whitish, spotted with blue towards the base; lobes 5, ovate, obtuse, 3–6 mm. long, 4–6 mm. wide; plicæ asymmetrical, broadly triangular, auriculate or subtruncate, 3–4 mm. wide, margin somewhat crenate. *Stamens* 5, 2–2·5 cm. long; filaments subulate without wings, united to the corolla-tube to the middle; anthers free, 3 mm. long, 0·5 mm. wide. *Ovary* stipitate, elliptic-oblong, narrowed at the apex and base; style short and broad; stipe rather stout, 1·5 cm. long. *Capsule* scarcely exserted from the corolla. *Mature seeds* subglobose, lamellose-rugose.

At an altitude of 9–14,000 ft. on the Tibetan borders of Szechwan. Though known to botanists for nearly forty years, this handsome species does not appear to have been in cultivation until it was raised from the seed of No. 4627 collected by Capt. KINGDON WARD. It is a somewhat variable species, as seen by the large series of herbarium specimens examined.

19. **Gentiana Przewalskii** Maxim. in Bull. Acad. Pétersb. xxvii. 502 (1881).

Perennial. Stems simple, erect, up to 20 cm. high, rather stout, green or somewhat purple-tinged. *Leaves of the barren stems* linear-lanceolate, subobtuse, 5–10 cm. long, 5–7 mm. wide, attenuate at the base in pairs into a membranaceous leaf-sheath, up to 2·5 cm. long. *Cauline leaves* few, lanceolate-spathulate, subacute, 2·5–4 cm. long, 7–9 mm. wide, united at the base in pairs to form a membranaceous leaf-sheath. *Flowers* sessile or subsessile, 2–10 together in a terminal inflorescence. *Calyx* cylindrical; tube entire, 1·5 cm. long, 8 mm. in diameter at the mouth, truncate and membranous between the lobes; lobes 5, unequal, linear, subacute, 3–6 mm. long, or occasionally longer, 1–2 mm. wide. *Corolla* clavate-cylindrical, white, tinged and streaked with blue; tube 4 cm. long, 1 cm. wide; lobes 5, broadly deltoid, 3–4 mm. long, 4–5 mm. wide; plicæ broadly triangular, very short, or subtruncate, 3–4·5 mm. wide. *Ovary* linear, stipitate, 1·5 cm. long; style short; stipe 1·5 cm. long. *Capsule* not exserted from the corolla-tube. *Mature seed* elliptic, lamellose-rugose.

In the dry districts of north-west China and north-east Tibet. In the province of Kansu this species appears to be not uncommon.

20. **Gentiana praeclara** Marquand in Kew Bull. 1928, 54.

Annual. Stem erect, up to 12 cm. high, much branched, scabrid, reddish-purple. *Basal leaves* none or very few. *Cauline leaves* rather crowded at the apex of the stem, lanceolate or ovate-lanceolate, acuminate, 1–2 cm. long, 4–9 mm. wide. *Flowers* sessile, deep rich purplish-blue with a greenish exterior, mostly large, but also occasionally some at the base of the stems much reduced in size. *Calyx* of the normal flowers 3–3·5 cm. long, 1 cm. in diameter, divided to the middle; lobes 4, lanceolate, acuminate, 5 mm. wide, with a broad scarious margin and broad wing (2 mm. wide in the middle, tapering towards the apex and base) extending throughout the length of the calyx. *Corolla* funnel-shaped; tube of the normal-sized flower 4·5–6 cm. long; lobes ovate-deltoid, slightly asymmetrical, 12 mm. long, 7 mm. wide, apex subacute; plicæ short, laciniate. *Stamens* inserted about the middle of the corolla-tube; filaments slender, subulate, 3–3·5 cm. long; anthers scarcely 2 mm. long. *Ovary* linear-oblong, stipitate; style 1·2–1·5 cm. long. *Mature seeds* not seen.

On the mountains in north-west Yunnan, *Forrest.*

This magnificent species, which was collected by FORREST several times on different expeditions in south-western China, is possibly no longer in cultivation.

The species belonging to Sect. Frigida, Series Annuae tetramerae to which this belongs, show some affinity with the Sect. Stenogyne in the gynæceum and other characters, but the plicæ are always symmetrical and not fused on one side with the adjoining corolla-lobe as in that Section.

21. **Gentiana pleta** Franch. ex Hemsl. in Journ. Linn. Soc., Bot. xxvi. 131 (1890).

Annual. Stems erect, up to 20 cm. high, slightly branched, particularly near the base, purple. *Basal leaves* absent at the time of flowering. *Cauline leaves* linear, obtuse, 1·5–2 cm. long, 1·5 mm. wide. *Flowers* numerous, racemose, shortly pedicellate or subsessile. *Calyx* purplish; tube membranaceous, 7–8 mm. long, 3–4 mm. in diameter; lobes 5, rarely reduced to 4, linear, acute, 7–9 mm. long, 1 mm. wide. *Corolla* tubular-clavate, pale blue spotted with purple; tube 2·5 cm. long, 1 cm. wide at the mouth; lobes usually 5, deltoid, acute, 3–3·5 mm. long, 2·5–3 mm. wide; plicæ small, asymmetrical, frequently bilobed, less than half the length of the lobes. *Stamens* 5, unequal, considerably shorter than the corolla-tube to which they are united to midway; filaments subulate, winged; anthers oblong, 1 mm. long. *Ovary* elliptic-oblong, stipitate, 1 cm. long; style 3–3·5 mm. long; stipe 1·5 cm. long. *Capsule* becoming slightly exserted from the corolla-tube. *Mature seeds* minute, ovoid, alveolate.

In marshy meadows and by the side of streams, and in bogs at an altitude of 7–13,000 ft. in north-western Yunnan.

SECTION VI. APTERA.

Perennial. Stems erect, the lower part surrounded by the old leaf bases. Basal leaves linear. Cauline leaves without a cartilaginous margin. Flowers numerous, terminal and axillary, frequently pedicellate. Calyx 5-lobed. Corolla 5-lobed, plicæ symmetrical, bifid. Filaments narrowly winged. Style short. Capsule sessile or stipitate. Seeds oblong, compressed, reticulate or smooth, wingless or rarely with a membranous wing on one side.

This Section comprises a very natural group of species which are native of the dry central plateau of Asia. Their most characteristic features are the fibrous bases of the old leaves surrounding the lower part of the stem and the smooth, wingless seeds.

KEY TO THE SPECIES OF THE SECTION APTERA.

Ovary long-stipitate :
 Calyx-tube not dimidiate-spathaceous . . . 26. *Kurroo* (p. 206)
 Calyx-tube dimidiate-spathaceous :
 Calyx-lobes reduced to short points :
 Basal leaves linear-lanceolate, acute ; uppermost cauline leaves not closely investing the inflorescence in the form of an involucre ; stem not very stout 28. *straminea* (p. 207)
 Basal leaves elliptic-ovate ; uppermost two pairs of cauline leaves closely investing the inflorescence in the form of an involucre ; stem very stout . 27. *crassicaulis* (p. 206)
 Calyx-lobes conspicuous, foliaceous . . . 22. *Waltonii* (p. 204)
Ovary sessile or subsessile :
 Corolla about twice the length of the calyx, yellow :
 Leaves broad, lanceolate ; calyx with minute teeth 24. *tibetica* (p. 205)
 Leaves narrow, linear ; calyx with subulate teeth . 25. *robusta* (p. 205)
 Corolla several times the length of the calyx, blue . 23. *gracilipes* (p. 204)

22. **Gentiana Waltonii** Burkill in Journ. As. Soc. Beng. n.s. ii. 310 (1906).

Perennial. Stems several, ascending, up to 40 cm. long, from a stout, fibrous caudex. *Basal leaves* linear-lanceolate, up to 20 cm. long, 3 cm. wide, acute. *Cauline leaves* in pairs, linear or narrowly elliptic, acute, 4–6 cm. long, 5–6 mm. wide, connate at the base into a sheath up to 1·5 cm. long. *Flowers* solitary in the axils of the upper leaves, or several together in a loose terminal inflorescence. *Calyx* dimidiate-spathaceous ; tube 18–22 mm. long ; lobes 5, unequal, ovate, acute, 3–8 mm. long, 2–4 mm. wide. *Corolla* deep sea-blue, rarely pale blue, purple or magenta ; tube elongate-campanulate, 3–5 cm. long, 1 cm. in diameter at the mouth ; lobes 5, broadly ovate, subobtuse, 7–10 mm. long, 6–9 mm. wide ; plicæ ovate-deltoid, 3–4 mm. long. *Stamens* 5, equalling the corolla-tube in length ; filaments united to it to the middle ; anthers oblong, 3 mm. long. *Ovary* stipitate ; style short ; stigmata recurved. *Seeds* small, ellipsoid, smooth.

Growing in masses on dry, sandy slopes and sunny granite cliffs in the neighbourhood of Gyantze, Pe and Lhasa, at an altitude of 10–12,000 ft. in Tibet.

23. **Gentiana gracilipes** Turrill in Bot. Mag. t. 8630 (1915).

ILLUSTRATION. *Loc. cit.*

Perennial, bearing rosettes of basal leaves and erect, lax flowering stems. *Basal leaves* narrow, lanceolate, acute, up to 15 cm. long, 2 cm. wide. *Cauline leaves* linear-lanceolate, acute, 3–5 cm. long, 3–4 mm. wide. *Flowers* axillary, solitary on long pedicels. *Calyx* scarcely a third the length of the corolla ; tube dimidiate-spathaceous ; lobes 3–5, triangular, acute. *Corolla* cylindric-campanulate, greenish outside, purplish-blue within, 3–3·5 cm. long ; lobes 5,

ovate-triangular, subacute, 6 mm. long, 5 mm. wide; plicæ triangular, acute, entire, about half the length of the lobes. *Stamens* equalling the corolla-tube in length, free from the middle; anthers oblong, 2 mm. long, pale yellow. *Ovary* subsessile, cylindric, 2·7 cm. long; style 3 mm. long; stigma shortly bilobed. *Mature seed* not seen.

This species, which is very closely allied to *G. dahurica* Fisch., was raised from Kansu seed, and flowered for the first time in this country in August 1914.

Specimens have subsequently been collected over the Tibetan border.

24. **Gentiana tibetica** King ex Hook. fil. in Hook. Ic. Pl. t. 1441 (1883).

ILLUSTRATION. *Loc. cit.*

Perennial. Stem erect, stout, unbranched, up to 60 cm. high. *Leaves of the barren stems* numerous and very large, lanceolate, acute, up to 34 cm. long, 9 cm. wide, with a rather prominent midrib and six lateral nerves. *Cauline leaves* in pairs, like those on the barren stems, but somewhat narrower; uppermost leaves forming an involucre around the dense, capitate inflorescence. *Flowers* many, closely congested at the apex of the stem and also a few in the axils of the upper whorls. *Calyx* membranaceous, tubular-campanulate; tube truncate, 1–1·3 cm. long; lobes 5, minute, acute. *Corolla* tubular-funnel-shaped, greenish-white; tube 2·5–3 cm. long; lobes 5, triangular-ovate, 4–5 mm. long, 3–4 mm. wide; plicæ shortly triangular. *Stamens* 5, much shorter than the tube; filaments subulate-filiform, winged and united to the corolla-tube below; anthers oblong, 2 mm. long. *Ovary* sessile; style short; stigmata recurved. *Seeds* oblong, 1·5 mm. long, dark brown, without wings.

At about 11,000 ft. altitude in the Chumbi Valley and in the neighbourhood of Yatung in Southern Tibet.

This species has been in cultivation for nearly half a century, as is shown by specimens in the Kew Herbarium received from an unspecified garden in Scotland in August 1885, where the plant may have been raised from native seed sent by Mr. GAMMIE.

25. **Gentiana robusta** King ex Hook. fil. in Hook. Ic. Pl. t. 1439 (1883).

ILLUSTRATION. *Loc. cit.*

Perennial. Stems ascending, up to 30 cm. in length, stout, unbranched. *Basal leaves* linear, acute, 20–30 cm. long, 12–14 mm. wide. *Cauline leaves* in pairs, linear-lanceolate, subacute, 3–4 cm. long, 1 cm. wide, connate at the base into a tube 1–1·5 cm. long. *Flowers* sessile, clustered at the apex of the stem and in the axils of the uppermost leaves. *Calyx* dimidiate-spathaceous; tube 12–15 mm. long; lobes 5, linear, acute, 2–4 mm. long. *Corolla* tubular-campanulate, white;

tube 2·5–3 cm. long, 8–11 mm. in diameter at the mouth; lobes 5, triangular or ovate-triangular, 4–5 mm. long, 3·5–4 mm. wide; plicæ triangular, about half the length of the lobes. *Stamens* 5, much shorter than the corolla-tube; filaments subulate, uppermost two-thirds free from the corolla-tube; anthers hastate-ovoid, 3–4 mm. long. *Ovary* linear-oblong, subsessile; style rather short. *Mature seeds* subfusiform, smooth, dark brown, 1·5 mm. long.

Southern Tibet. This species was first collected by Sir JOSEPH HOOKER during his Himalayan travels. It was described from specimens collected in the Chumbi Valley in August 1877. Its distribution was found to extend to a number of localities in the neighbourhood of Gyantze by members of the Tibet Frontier Commission in the years 1903 and 1904, and it was again collected at an altitude of 14,000 ft. on the first Mount Everest Expedition in July 1921.

26. **Gentiana Kurroo** Royle Illustr. Bot. Himal. 278, t. 68, f. 2 (1835).

ILLUSTRATION. *Loc. cit.*

Perennial. Stems up to 25 cm. high, decumbent or ascending from a rather stout caudex surrounded by the bases of the old leaves. *Basal leaves* numerous, forming a rosette, linear, subacute, up to 10 cm. long, 1·5 cm. wide. *Cauline leaves* in pairs, narrow linear, 2·5–4 cm. long, 1·5–3 cm. wide, united at the base into a submembranaceous sheath. *Flowers* terminal, solitary or rarely two or more together on short pedicels. *Calyx-tube* 10–12 mm. long; lobes 5, linear, subacute, equalling or somewhat exceeding the tube in length; sinus between the lobes truncate. *Corolla* more or less funnel-shaped, 3·5–5 cm. long; lobes 5, ovate, 10 mm. long, 6–7 mm. wide, subacute; plicæ membranaceous, triangular-deltoid, $\frac{1}{4}$–$\frac{1}{3}$ the length of the lobes. *Stamens* much shorter than the corolla-tube, to which the filaments are fused along the basal half; anthers 3–4 mm. long. *Ovary* long-stipitate; style short. *Seeds* oblong-ovoid, not winged.

In the north-western Himalaya, in the subalpine zone.

This species has been re-introduced to cultivation recently. ROYLE adopted the native name of the plant for the specific epithet when describing it for the first time a century ago, and stated that the root was used medicinally in India.

27. **Gentiana crassicaulis** Duthie ex Burkill in Journ. As. Soc. Beng. n.s. ii. 311 (1906).

Perennial. Stems thick, hollow, erect, about 30 cm. high, arising from a thickened rootstock, surrounded by the fibrous bases of the old leaves. *Basal leaves* elongate, elliptic-ovate, 5-nerved, 14 cm. long, 5 cm. wide, connate at the base and petiolate; petiole 4 cm. long. *Cauline leaves* smaller, the lower ones broadly connate like the basal leaves, the upper four sessile and scarcely connate, closely investing

the inflorescence in the form of an involucre. *Flowers* numerous, densely aggregated. *Calyx* membranaceous, split down one side (dimidiate-spathaceous), with minute, subacute lobes. *Corolla* greenish-white, spotted; tube 12–15 mm. long, 4 mm. in diameter; lobes 5, ovate, obtuse, 4 mm. long, 2–2·5 mm. wide; plicæ acute, 1 mm. long. *Stamens* 5, equalling the corolla-tube in length and united to it through half their length. *Ovary* elongate, stipitate, 8–9 mm. long; style 1 mm. long. *Seeds* narrowly ellipsoid, pointed at one end, 1·3 mm. long, smooth, lustrous brown.

In damp places on the mountains of Yunnan and western Szechwan in China.

This species was already in cultivation in the Royal Botanic Gardens, Kew, a quarter of a century ago.

28. **Gentiana straminea** Maxim. in Bull. Acad. Pétersb. xxvii. 502 (1881).

Perennial. Stems rather stout, ascending, up to 25 cm. long, several arising from a rather stout caudex surrounded by a fibrous investment of the old leaf-sheaths; internodes long. *Basal leaves* linear-lanceolate, acute, up to 20 cm. long, 2 cm. wide, 5-nerved. *Cauline leaves* linear-oblong, acuminate, 4–6 cm. long, 6–8 mm. wide, attenuate in pairs into a submembranaceous leaf-sheath. *Flowers* pedicellate, in subterminal racemes. *Calyx* dimidiate-spathaceous; tube whitish, membranaceous, with green vascular bundles, 1·5–1·8 mm. long; lobes reduced to 2–3 short, subulate teeth at the termination of the vascular bundles. *Corolla* narrowly obconical, greenish-white; tube 3 cm. long, 1 cm. wide at the mouth; lobes 5, ovate, subacute, 5 mm. long, 4 mm. wide; plicæ bifid, about a third the length of the lobes. *Stamens* 5, subequal, 2 cm. long; filaments united to a little above the middle, narrowly winged; anthers oblong, 1·5–2 mm. long, at first united above the stigma, afterwards free. *Ovary* subsessile, elliptic-oblong; style rather short. *Capsule* very shortly stipitate. *Mature seeds* dark brown, shining, reticulate, without wings.

Kansu and north-east Tibet, occurring in the region of low rainfall.

SECTION VII. PNEUMONANTHE.

Perennial. Stems tall, erect or ascending. Basal leaves absent. Cauline leaves large, without a cartilaginous margin. Flowers sessile. Calyx entire; lobes 5. Corolla with 5 lobes and asymmetrical plicæ. Filaments winged. Style short. Capsule stipitate. Seeds linear, reticulate, surrounded by a membranaceous wing.

A considerable number of species described by FRANCHET were placed in this section by that author. In the restricted sense of

KUSNEZOW's monograph of Eugentiana (Act. Hort. Petrop. xv. 1904), however, Sect. Pneumonanthe, of which the well-known British species *Gentiana Pneumonanthe* L. is the type, excludes all these; the only Chinese species retained in the section being *G. scabra* Bunge, which is a native of the northern part of the country.

29. **Gentiana scabra** Bunge, Verz. Alt.-Geb. 21 (1836).

ILLUSTRATION. Rev. Hortic., 1904, 35, fig. 9.

Perennial. Stems erect, solitary, purplish. *Roots* stout and fleshy. *Basal leaves* none. *Cauline leaves* sessile, thick, elliptic-lanceolate, acute; upper surface dark green, frequently suffused with reddish-purple, margin and midrib minutely scabrid. *Flowers* sessile, terminal or subterminal, more or less closely aggregated. *Calyx* also purplish, not winged; tube 1–1·5 cm. long, 6–8 mm. in diameter at the mouth; membrane whitish, truncate between the lobes; lobes 5, erect or somewhat recurved, linear-oblong, acute or subacute, 6–10 mm. long, 1·5 mm. wide. *Corolla* campanulate, blue; tube 4 cm. long, 1·5–2 cm. in diameter at the mouth; lobes 5, ovate, expanded in the middle, acute, or acuminate, 10–12 mm. long, 8–9 mm. wide; plicæ ovate-acuminate, entire, half as long as the lobes. *Stamens* 5, equal, 3 cm. long; filaments broadly winged; anthers oblong, 3–4 mm. long, less than 1 mm. wide. *Ovary* stipitate; style short. *Capsule* scarcely exserted. *Mature seeds* linear, reticulate, winged.

In dry, shady places on hills and on grassy mountains in Manchuria and Northern China.

SECTION VIII. ISOMERIA.

Annual or perennial, without basal rosette leaves. Flowers rather large. Calyx-tube entire; lobes 5. Corolla with 5 lobes and large symmetrical plicæ. Capsule oblong, narrow, acute at the apex, stipitate, exserted or included. Seeds oblong, compressed, wingless.

This is a small Section, which is restricted to the interior of Asia. *G. Delavayi* Franch. is the only Chinese species known. The species were originally included in Sect. Pneumonanthe.

KEY TO THE SPECIES OF THE SECTION ISOMERIA.

Plicæ entire 30. *Delavayi* (p. 208)
Plicæ fimbriate or much divided at the apex:
 Calyx-lobes oblong-linear, acute . . . 31. *cachemirica* (p. 209)
 Calyx-lobes spathulate, recurved 32. *Loderi* (p. 209)

30. **Gentiana Delavayi** Franch. in Bull. Soc. Bot. France, xxxi. 377 (1884).

Annual. Stems erect, either very short or up to 10 cm. high, branched, densely papillose-scabrid, dark purple. *Basal leaves* ovate, subobtuse, 1·5 cm. long, 1 cm. wide. *Cauline leaves* densely imbricate,

narrowly oblong, subobtuse, 3–4 cm. long, 1–1·5 cm. wide. *Flowers* numerous, sessile, capitate, densely congested and partly hidden by the uppermost leaves. *Calyx* scabrid; tube obconic-tubular, 1–1·5 cm. long; lobes 5, lanceolate-spathulate, equalling or somewhat exceeding the tube. *Corolla* tubular, 4–5 cm. long, 1·5 cm. in diameter at the mouth, bright blue; lobes 5, deltoid, 7–8 mm. long, 6–7 mm. wide; plicæ ovate, membranaceous, half the length of the lobes, "maroon and green." *Stamens* 5, shorter than the corolla-tube; filaments united to the middle. *Ovary* broadly oblong, stipitate; stipe short and stout; stigmata linear-oblong, recurved. *Capsule* only slightly exserted. *Mature seed* oblong, compressed, without wings.

On stony mountain pastures and on the margins of pine forests, etc., in north-western Yunnan.

31. **Gentiana cachemirica** Decne. in Jacquem. Voy. Bot. iv. 111, t. 117 (1844).

ILLUSTRATION. *Loc. cit.*

Perennial. Stems several, ascending, 8–10 cm. long. *Basal leaves* few, ovate. *Cauline leaves* in pairs, ovate or ovate-rotundate, 7–9 mm. long, 6–8 mm. wide, attenuate at the base into a short petiole, apex subobtuse, inconspicuously 3-nerved. *Flowers* terminal, usually solitary, occasionally 2–3 together, sessile. *Calyx* partly hidden by the uppermost leaves; tube 8 mm. long, 7 mm. in diameter at the mouth; lobes 5, linear-oblong, acute, 5–7 mm. long, 1·5 mm. wide; sinus rounded. *Corolla* campanulate, blue; tube 2·5 cm. long, 1–1·3 cm. in diameter at the mouth; lobes 5, ovate-rotundate, subacute, 6–7 mm. long, 6 mm. wide; plicæ 3–4 mm. wide, much shorter than the lobes, dentate. *Stamens* 5, somewhat unequal, shorter than the corolla-tube; filaments subulate, inserted near the base of the corolla-tube; anthers ovate. *Ovary* linear, stipitate, rather abruptly attenuate into the short style and short stipe. *Mature seed* not seen.

On rocky mountain-sides at an altitude of about 9,000 ft. in the Western Himalaya.

32. **Gentiana Loderi** Hook. fil. in Hook. Ic. Pl. t. 1440A (1883).

ILLUSTRATION. *Loc. cit.*

Perennial. Stems numerous, about 10 cm. long, prostrate, ascending at the apex, purplish, without forming a basal rosette. *Cauline leaves* subsessile, in pairs, broadly elliptic, obtuse, 10–12 mm. long, 8–10 mm. wide, margin scabrid below. *Flowers* solitary, sessile. *Calyx* campanulate, tube 9–10 mm. long; lobes 5, spathulate, recurved, slightly shorter than the tube. *Corolla* tubular-campanulate, pale blue; tube 2–2·5 cm. long, 1 cm. in diameter at the mouth; lobes 5, ovate, 8–10 mm. long, 7–8 mm. wide; plicæ fimbriate, much shorter than the lobes. *Stamens* 5, slightly shorter than the corolla-tube,

united to it to the middle; anthers ovoid. *Ovary* sessile, attenuate at the apex; style short, stigma bifid. *Mature seed* not seen.

Originally received from Kashmir, where its type locality was uncertain, this fine species has been recently raised by Mr. MUSGRAVE.

It is stated to be common in rock crevices at Sonamarg, at an altitude of 9,000 ft., and specimens have been examined from a number of other localities in the State of Kashmir.

SECTION IX. CHONDROPHYLLA.

Mostly perennial, usually small plants. Leaves usually with a cartilaginous margin. Flowers small. Calyx entire; lobes 5. Corolla-lobes 5; plicæ symmetrical. Stigmata reflexed. Capsule short, rounded at the apex, stipitate and frequently ultimately exserted from the corolla by the elongation of the stipe. Seeds oblong, smooth, wingless.

This Section includes the largest number of Asiatic species, but the majority are small plants with rather inconspicuous flowers, and consequently few have ever been in cultivation. Among the uncultivated species are two or three which appear to be widespread weeds in China; others, however, are only known from single localities and would repay introduction to gardens on account of their beauty.

KEY TO THE SPECIES OF THE SECTION CHONDROPHYLLA.

Calyx-lobes obovate-spathulate:
- Cauline leaves orbicular or reniform . . 34. *crassuloides* (p. 211)
- Cauline leaves lanceolate, recurved . . . 33 *moniliformis* (p. 210)

Calyx-lobes linear-lanceolate 35. *pentasticta* (p. 211)

33. **Gentiana moniliformis** Marquand in Kew Bull. 1931, 86.

Annual. Stems ascending, glabrous, slightly branched, up to 6 cm. long. *Basal leaves* obovate-spathulate, acuminate, 6-nerved, up to 17 mm. long, 4–5 mm. wide. *Cauline leaves* lanceolate, recurved, attenuate into the petiole, 6–7 mm. long, 3 mm. wide, connate in pairs. *Flowers* terminal on the branches, shortly pedicellate. *Calyx* scarcely campanulate; tube 5–6 mm. long, 2·5–3 mm. in diameter; lobes 5, spathulate-ovate, slightly recurved, 2–3 mm. long, apex acute. *Corolla* only slightly exceeding the calyx, pale greenish-blue; lobes 5, deltoid, acuminate; plicæ subtruncate. *Stamens* short. *Ovary* stipitate; stigma subsessile. *Capsule* 4 mm. long, ovoid, winged, much exserted from the corolla on a stout stipe 2–2·5 mm. in diameter. *Seeds* oblong, scarcely 0·5 mm. long, reticulate, decorated with minute moniliform ridges.

In a marshy pasture on the hills east of Tengyueh, Yunnan, at an altitude of 7,000 ft., *Forrest* 7655.

It is doubtful if this species is still in cultivation, though it may persist in some gardens where FORREST's seeds were raised.

34. **Gentiana crassuloides** Franch. in Bull. Soc. Philom. Paris, Ser. VIII. iii. 148 (1891).

Annual. Stems numerous, erect, 5–8 cm. high, much branched; branches slender, erect, faintly scaberulous. *Basal leaves* broadly ovate, 3 mm. long, 3–4 mm. wide, surrounded by a narrow cartilaginous margin, deciduous after the time of flowering. *Cauline leaves* on the lower part of the stem subsessile, orbicular; those on the upper part of the stem reniform, 2 mm. long, 3 mm. wide, margin cartilaginous. *Flowers* solitary at the apices of the branches. *Calyx* tubular, expanded above, 6–8 mm. long; lobes 5, short, obovate-spathulate, margin cartilaginous, recurved. *Corolla* narrowly tubular, 10–16 mm. long, deep blue; lobes 5, ovate, 2–3 mm. long, 1–2 mm. wide; plicæ minute. *Ovary* broadly oblong, long-stipitate, winged; style very short; stigma recurved. *Capsule* becoming exserted from the corolla by the elongation of the stipe on maturity. *Mature seeds* triquetrous, minutely rugulose, pale brown, 1 mm. long, 0·5 mm. wide.

On grassy slopes on the mountains of Shensi and Szechwan, at an altitude of 10–12,000 ft. in Western China, where it has been collected by GIRALDI, PRATT, PURDOM, WILSON and others.

35. **Gentiana pentasticta** Marquand, sp. nov.; ex affinitate *G. subtilis* H. Sm. sed corollae lobis obtusis emucronatis caule e basi multiramoso differt.

Annual, with a slender tap-root and numerous, ascending stems up to 2·5 cm. long, arising from the base. *Basal leaves* few, ovate or elliptic-ovate, acute, 5–7 mm. long, 2 mm. wide. *Cauline leaves* in two or three pairs, lanceolate, acute, recurved, 1–2 mm. long, margin narrowly cartilaginous. *Flowers* solitary, terminal, erect or ascending; pedicels rather slender, purplish, 1–3 mm. long. *Calyx* reddish-purple; tube campanulate, 3 mm. long, 1·5 mm. wide at the mouth; lobes 5, linear-lanceolate, acute, recurved, 1·5–2·5 mm. long; sinus truncate. *Corolla* tubular-campanulate, 5–6 mm. long, white, with five dark blue spots on the exterior beneath the lobes; tube 2–2·5 mm. in diameter at the mouth; lobes 5, very short, rotundate, obtuse, 1·5 mm. wide, margin minutely erose; plicæ slightly shorter than the lobes, nearly equalling them in width. *Stamens* 5, 3 mm. long; filaments subulate, united to the corolla-tube to midway; anthers oblong, free, 1 mm. long. *Nectaries* 5 at the base of the gynœcium, rather conspicuous, subglobose, yellow. *Ovary* oblong-ovoid, sessile; style very short; stigmata recurved. *Seeds* oblong, without wings.

NEPAL. Bhut Pokhri, 16–17,000 ft. alt., 1930, *Capt. Lall Dhwoj* 469.

The type specimen is in the British Museum Herbarium. This new species is a pretty little plant, judging from dried specimens. Its nearest ally is a native of Western China.

A SHORT SURVEY OF THE GENUS VIOLA.

PART II.—THE CHAMAEMELANIUM AND MELANIUM SECTIONS.

By LIEUT.-COLONEL E. ENEVER TODD, O.B.E., M.A., R.A.P.C.

THE first part of this survey (JOURNAL, R.H.S., **55**, p. 223, 1930) dealt with the Nomimium and Dischidium sections of the genus Viola. The former was very roughly described as what is commonly thought of as the usual Violet, *i.e.* the Viola with the boat-shaped lowermost petal. The Melanium section, on the contrary, was, equally roughly, described as what is commonly thought of as the Viola of gardens, or in fact the Pansy, and here the flowers are flat-faced. I also attempted to indicate that in nature there is no clear cut-and-dried line of distinction between species and species, group and group, section and section; but for the most part, one fades into another, and it is only a necessary mode of thought of the classifying botanist, confronted with upwards of 500 species and five times that number of synonyms, that makes his diagnosis appear to lay down clean-cut divergencies between species, groups and sections. Thus the last of the Nomimiums began to show certain characters of the Dischidiums; and the Chamaemelaniums are half-way between the Violets and the Pansies.

THE CHAMAEMELANIUM SECTION.

This section includes some of the most beautiful of American Violas and some of the, if not the most beautiful of all Violas. Yet they are hardly known in England. Technically this section is distinguished by being caulescent (with one exception); the blooms usually yellow, rarely white, and the upper petals often brownish or violet; the spur very short; the stipules free; the style club-shaped with lateral beakless stigma and frontal orifice. There are thirty species, a few from Asia, a few from Mexico, but most from the Pacific States of America.

32. *Viola Barroetana* Schaffner.—This is the only acaulous Violet of the section, and is a dwarf plant with almost undivided vertical root, oval long-stemmed leaves, and small yellow flowers. It is an alpine, from between 6,000 and 8,000 feet on the mountains of the Mexican State of San Luis Potosi.

"NUTTALL'S VIOLETS."

33. *V. pedunculata* Torr. & Gray.—This I take as the best with which to illustrate the group of "Nuttall's Violets," though *V. Nuttallii* itself, the Yellow Prairie Violet, is more widespread and has many

variations, each under a separate name. The plants are at first acaulous, and only later caulescent. *V. pedunculata* has very large flowers of deep gold, with rounded petals, on long stems, standing well above the leaves. The leaves, also long-stemmed, are like those of the common Sweet Violet but more reniform, smaller, flattened, and more abruptly narrowed into the petiole. It is abundant round San Francisco Bay, especially at the Golden Gate, and from there it stretches westwards as far as Arizona. FARRER writes that the two upper petals are veneered on the reverse with mahogany, so that the fields are all gold one minute, and all bright brown the next, as its blossoms ripple under the wind. This agrees with *Bot. Mag.*, t. 5004, but scarcely with Plate 45 in BRAINERD'S "Violets of North America," in which the fully-opened petals are shown as only having brown lines inside. BRAINERD states that this Violet is often cultivated in gardens and the flowers are on sale in the market. I imported some plants from California, but my own did not live, and though some I gave away were stated afterwards to be doing well, I have forgotten to whom I gave them. If anyone reading these notes is successful with *V. pedunculata*, I should be glad to hear from him. It is difficult to understand why such a beautiful Violet is not in commerce as it is in America.

THE GOLDEN FLOWER.

34. *V. chrysantha* Hooker.—Called by the elder Hooker "the Golden Flower," it has been stated that this, together with *V. pedunculata*, *V. Hallii* and *V. cuneata*, is one of the most beautiful violets of the Pacific coast. The group of which I take this as the representative has the leaves very much divided, a short rootstock with numerous fibres, and, like the foregoing, is at blooming time nearly acaulous. In *V. chrysantha* the leaves are divided right to the midrib into linear segments. The blooms are deep orange-yellow, and the petals striated with brown. Its area extends over the 600 miles from south to north of California, and it just crosses into Oregon. Stations for it with familiar names are Monterey and Shasta County; and it ascends to 7,200 feet, so should be hardy enough in England. Another of the group, *V. Hallii*, a very beautiful and scented Violet, though rare (but obtainable), has the upper petals violet and the lower lemon-yellow. It too should be hardy, as it grows at 5,000 feet, as, for example, "near the summit of Buck Mountain, frequently in gravelly, open spots in the chaparral." A third, *V. Beckwithii*, has the upper petals dark blue, and the others either lilac or white. It has the largest flowers of the group, but I imagine it is a lowlander.

A HIGH ALPINE.

35. *V. acutifolia* W. Bckr.—I now come to a subsection with short rootstock having numerous fibrous roots, erect, well-developed stems, a basal rosette of leaves, and the stem leafless in its lower part.

My first representative, however, has just one leaf about the middle of the stem. The flowers are yellow, of medium size, two or three on each of the two or three stems. This species hails from rock fissures at 10,000 feet or so on the Pamirs, Karakorams, and the mountains of Chinese Turkestan. By REGEL and other botanists it was regarded as a variety of *V. biflora*—a fact which is enough to show that even yet we have made no very long way from the Dischidium section.

A YELLOW CIRCUMPOLAR VIOLET.

36. *V. glabella* Nutt.—The next group has the stem quite bare, and leaves at the top of the stem only, apart from the basal leaves. It includes ten species, the names of some of which are quite well-known in gardens, *e.g. V. hastata*, *V. glabella*, *V. eriocarpa* (or *V. scabriuscula*), and *V. pubescens*. The last-named is the best known, but I have not found either it or its near cousin, *V. eriocarpa*, particularly attractive, while, though it is widespread in the eastern half of North America, its distribution is not so interesting as that of *V. glabella*. Four of the group are exclusively Asiatic; five are purely American; but *V. glabella* belongs to both continents, ranging from the extreme north-east of Asia through the Kurile Islands to Alaska, and thence descending to California. Its centre is stated to be Alaska, and it is certainly a boreal or alpine plant. GRAY says that its northernmost forms come too near the Asiatic *V. uniflora*, while the forms of the Northern Rockies are not easily distinguishable from *V. pubescens*. In Northern California it is found both at sea-level and at considerable elevation in the mountains, both stations having much the same low temperature owing to the northern currents of the ocean on the one hand and the snows of the Sierra Nevada on the other. It has only one or two round or reniform basal leaves, stems up to a foot high, each with one or two yellow, smallish flowers, two or three short-stemmed, roundish leaves at the top of the stem, and is a denizen of moist woods. The group as a whole (except *V. pubescens*, which has a preference for a dry spot) has a liking for damp places enriched with dead leaves, or meadow bottoms full of humus.

THE BEST CANADIAN VIOLET.

37. *V. canadensis* L.—The same subsection had a third and a very valuable group of five or six species, all inhabitating damp, rich woodlands, and all with the upright stems of the subsection, but here leafy all their way up. I have seen the real *V. canadensis* once only, though various plants have been sent to me under that name; and my recollection is that it was one of the most beautiful of Violets, and yet, because of its flatness, more like a Viola. Indeed, if a rather far-fetched analogy may be permitted, it was reminiscent of a five-petalled Trillium in miniature. The inner face of the petals is white, with bright yellow eye, their outside flushed with violet, and the three lower petals pencilled with fine dark lines. To add to its attractions,

it is sweet-scented. It is very widespread in nature, extending along Southern Canada from New Brunswick to Saskatchewan, descending on the east as far south as Alabama and on the west to Arizona and New Mexico, and recorded even from Chihuahua, well down in Mexico itself, but always ascending the higher into the mountains the further south it goes, till in Mexico it appears at 7,500 feet. The allied *V. rugulosa* (*V. Rydbergii*) is said to be even finer, but I have not seen it. The label in a very famous garden used to give the title to a very inferior plant, and, in addition, proclaimed that *V. rugulosa* came from Greece—an error due to the fact (this is all I could surmise) that the plant was received from Delphis. But there happens to be a non-Grecian Delphis in the United States, and the Central States are the home of *V. rugulosa*. Another of the same group, the Two-eyed Violet (*V. ocellata*), has the upper petals dark purple, the two lateral pale yellow, with a violet spot at the base of each, and the lowermost also pale yellow with violet striæ. It is a rare species, from, *e.g.*, just north of the Golden Gate; and similar, equally beautiful and still rarer is *V. cuneata* from the borderland between California and Oregon.

Three Mexican Alpines.

38. *V. Painteri* Rose & House.—The last subsection of the Chamaemelaniums consists of three Violets, mostly from the State of Hidalgo in Mexico, characterized by their flagelliform or runner-like stems; otherwise near the foregoing but with the yellow flowers of *V. pubescens*, with which at first Hemsley identified one of them. *V. Painteri* is the most alpine of the three, always above 9,500 feet, usually growing under firs, with veined petals of bright yellow, the two uppermost strongly tinged with reddish-brown.

The Melanium Section.

We now come to the Violas as distinct from the Violets, though we have seen that the last section began to show the flat, broad petals of the Melaniums. The section is generally caulescent, perennial (except most of the *V. tricolor* group), with leaf-like (instead of scarious) stipules, the three lower petals hairy at their base, the spur usually relatively long, the style curved at the base and suddenly thickened at the apex, and the stigma almost rectangular as seen from the front, with specially wide orifice and two frontal hairy lips. There are some seventy-two species, confined mainly to Southern Europe, with offshoots into Asia Minor, and one North American and one South American. The Viola is essentially an European product.

The Pansy of the Alps.

39. *V. alpina* Jacq.—Just to show the fallacy of hard-and-fast distinctions, the first Melanium with which we have to deal is acaulous,

and has the stipules membranous and more or less connate instead of free. It stands by itself. Dwarf, with the leaves all radical, long-stemmed and roundish, medium to large flowers of rich purple with a white eye, the upper petals standing away one from another to give it a startled look, it attracts every collector but is a heart-breaking thing to grow. It has every appearance of being easy; but though I have tried dozens of plants, I have wakened up one morning or other to find some slug had left not a trace. It is peculiar to the mountains (at about 6,000 feet) of Austria, Transylvania, and the Carpathians, generally in the close alpine turf, sometimes on screes, and always on limestone. It is especially abundant on the Schneeberg and Raxalpe (both within easy reach of Vienna, and, to be precise, round the Karl Ludwig Haus on the latter), and also on the High Tatra at the edge of Poland.

The Cenisia Violas.

40. *V. cenisia* L.—This large group of fourteen species is perhaps the most interesting of all, and though I take *V. cenisia* as its representative because it is the best known, I am not sure that it is the most beautiful or the easiest (but to write of ease in this connexion is rather foolish, for I doubt if anyone has kept *V. cenisia* for more than about a year, at least in England), and it is not the one I know best myself. Were it not that the genus includes a most amazing range of form, one would scarcely credit that the leaf of the Cenisias is a Viola leaf at all; it suggests a survival from some bygone geological age, and this suggestion is strengthened by the extremely peculiar distribution of the group. They inhabit only the tops of the high mountains over 6,000 feet, and there seems little or no correlation between the particular peaks that they have chosen. Thus *V. cheiranthifolia*, white with down, and with large violet flowers (perhaps the largest of the group), blooms in June on the Peak of Teneriffe. Next, *V. crassiuscula* (*nevadensis*) blooms in July and August above 8,000 feet on the Sierra Nevada in the south of Spain, and becomes increasingly common the higher you go, up to the 11,400 feet of the Picacho de Veleta. It obviously appreciates having a good-sized stone sitting on top of it, and as it is very floriferous, the stone is ringed with tight masses of bright lilac blossoms. It is said to be even less clump-forming than *V. cenisia*, but this is wrong, as the clumps I have collected came up a solid mass of fibrous roots. Proceeding westwards, we come next to *V. cenisia* itself, abundant, though in a restricted area, between 6,500 and 8,000 feet in the Maritime Alps. There are a small number of stations in the Cottians and the Graians (including the Mont Cenis Pass), and then *V. cenisia* becomes frequent again in high places of the Bernese Oberland. East of this, *V. Comollia* flowers at about 7,800 feet in the Bergamasks on the far side of the Lake of Como, and is considered by some to be the most distinct and brilliant of the Cenisias. It is very rare and requires re-discovering, for three authorities who should know describe its colour in very different terms.

I know that M. CORREVON has seen it on its native screes, and he gives it as " Rose vif ; vert jaunâtre au revers des pétales," which FARRER characteristically translates as " Flaming vinous rose, with an opaque reverse of nankeen yellow to the petals." It has the additional attraction, peculiar to a few Cenisias, of being very fragrant. I have thought that *V. Comollia* must be worth tracking down ever since I read a Farreresque description of it by a famous Alpine climber, whose propensities always seemed to me to be suicidal rather than botanical.

Then we jump to another peak, this time in the Abruzzi, in Central Italy, where, on La Majella below Monte Amaro, the " classical and only habitat," there flowers in July the violet-coloured *V. magellensis*. Then we take a giant's stride to several peaks in Serbia and Macedonia, where (as on Mt. Pirin) is the sky-blue *V. Grisebachiana*, about which there has been much dispute among front-rank field botanists. *V. perinensis*, from the same mountain, may be much the same thing, though it is yellow ; while *V. brachyphylla*, also from Macedonia, and also yellow, may again be the same thing. Another Macedonian, and also Albanian, again at 8,000 feet or more, is *V. albanica*, with large flowers of pale rose, with the upper petals sometimes dark red-violet, thus reproducing the colour of the Bergamask Cenisia. Another jump and we are on Mt. Parnassus in Greece, where, in high rock fissures, there grow the sweet-scented, violet flowers of *V. poetica* ; another jump and we are in Crete, standing on the alpine screes of Mt. Ida, where *V. fragrans* grows, very akin to *V. poetica*. Finally, we have the sky-blue *V. crassifolia* from a few mountain peaks in central Asia Minor ; the yellow *V. minuta* from 10,000 feet in the Caucasus ; and (a relatively new discovery) a variant of *V. cenisia* from Mt. Alagoz in Armenia.

The general characteristics of the Cenisia Violas have often been described ; and they appear to me to remain the same in all essential particulars in all of the geographical forms named above. The plants may be dwarf and clump-forming, or long-stemmed and rambling ; they may be smooth or more or less pubescent, or velvety or grey or even white with down ; the petiole may be equal or double or three times the blade of the leaf ; the leaves always small but varying largely, thick and fleshy or thin in texture, the surface smooth or plicate, the edge entire or crenate, the contour lanceolate or oblong or ovate or round ; the stipules, always leaf-like, may be linear, oblong or spathulate, entire or with one or two or even more lateral lobes, the lobes inserted at the base or the middle or upper part of the main segment, sometimes consisting of only a rudimentary jag at the base ; the lamina of both leaf and stipule narrowed into the petiole gradually or abruptly ; the sepals linear, lanceolate or oblong, acute or obtuse, ciliate or not and crenate or not ; the auricles small or conspicuous, toothed or entire ; the spur of varying length, slender or thick, straight or curved, acute or obtuse ; the pedicels short or long (up to 2¼ inches) ; the flowers relatively small or large (up to an inch across), solitary or

up to five on the stem; the petals more or less narrow or rounded (the lowest one always obcordate). Each species does not of course vary in these ways, but each has one or more characteristics belonging markedly to some other species. Thus some forms of *V. cenisia* from Mont Ventoux have the stipule-form that is a distinguishing mark of *V. magellensis*. I am frankly unable to understand how it is considered scientifically accurate to segregate so many species on the ground of minute and not-clean-cut divergencies, one or other of which reappear in widely-separated areas; and I would be content to say that the type-species, *V. cenisia*, is extremely variable in detail, were it not that it would be impossible for anyone to mistake the Sierra Nevada plant, for example, for the Mont Cenis plant, which suggests that the habit of a plant has more to do with its distinctness than, *e.g.*, the precise shape and length of its leaves.

The Valderia Violas.

41. *V. valderia* All.—This Viola also has been fully described in easily available books. The main characters which distinguish it from the Cenisias are: the stipules digitately divided into two to five or even seven unequal lobes; the lamina of the leaf tapering gradually to each end, rather after the manner of *V. arborescens*; the more tufted habit of the plant; its usually taller and more branching stems; its pale green leaves, more usually pubescent; the flowers borne in numbers up to five on each stem; its usually pale lavender flowers, though they graduate into purple; and the fact that it is almost exclusively granitic, whereas *V. cenisia* is exclusively found on limestone. Its home is the central body of the Maritime Alps, where it ascends as high as, but also descends lower than, *V. cenisia*. It was at one time thought that there were no intermediates between the two species, even in the area where they converge; but forms of *V. cenisia* collected on the outlying mass of Mont Ventoux, not far from Avignon and far from the focal centre of *V. cenisia* (with stems of nearly a foot, two or three flowers on each stem, and stipules divided into five), are barely distinguishable from equally luxuriant forms of *V. valderia* collected on Monte Toraggio, an outlier to the east as Mont Ventoux is to the west. Again, Burnat collected specimens of *V. valderia* at the Lake of Ruabons, having only 2-3-lobed stipules, the lobes inserted at the middle of the central segment in the same way as the Monte Majella form of *V. cenisia*. The Pyrenean representative of the Valderias, *V. diversifolia* (also known as *V. vestita* or *V. Lapeyrousiana*), a silky-downy plant with crowded rounded leaves and petiole equal to the lamina (thus much more like those of *V. cenisia*), can only be said to be on the whole nearer the Valderias than the Cenisias. It has plicate leaves; but even on the Mont Cenis a few specimens of *V. cenisia* have been collected with plicate leaves. A single specimen of *V. diversifolia* collected in Western Piedmont, at the south-east edge of the Cenisia area, lay in the Berlin herbarium for seventy years and was

regarded as inexplicable, until BECKER found another in the same district; and more recently Mr. GAVIN JONES sent me plants he had collected at about the same place, which I was (not then knowing of the other specimens) afraid to assign to *V. diversifolia* but which I could not fit in with the type of *V. cenisia*. It is curious too that this plant is found on both calcareous and siliceous formations. The remaining Valderias are three Macedonians, all ashy or white, one with very large intense violet-purple flowers, another intense violet with paler obverse, the third yellow. They are all subalpines, and might be easier of cultivation if plants could be obtained (I have never heard of any of this section being kept for long, except for *V. valderia* by Dr. LEMPERG, and *V. nummularifolia* by M. CORREVON). Here again it is difficult to draw a hard-and-fast line between one species and another, for narrow-leaved forms of *V. Dörfleri* are indistinguishable from forms of *V. valderia* found at high altitudes, such as the Madonna delle Finestre; while low forms of *V. valderia* collected on Monte Toraggio have the same luxuriant habit as *V. allchariensis* from Central Macedonia. I am, of course, inferring not that it is fallacious in any way to divide one species from another, but that, at least in this genus, it would seem that hard-and-fast distinctions are, in fact, seldom true to nature.

THE FALSE V. RUPESTRIS.

42. *V. nummularifolia* All.—Somewhere, I think, FARRER, who knew this well, writes of it as a Violet and not a Pansy. On the contrary, it is just as much a Pansy as the foregoing, and is separated from the Cenisias and the Valderias only or mainly by having the stipules short, undivided, ovate-lanceolate and toothed, like those of *V. rupestris*. FARRER'S description needs no comment or addition. It has the habit of the Sierra Nevada Viola, in that its branches radiate round a boulder to rim the boulder's edge with a mass of flowers, in this case of periwinkle blue; but, unlike *V. crassiuscula*, which has a mass of fibrous roots, this has a long tap-root, and therefore I have hopes that my Sierra Nevada specimens may be more amenable to cultivation, despite the fact that it is probably asking too much of Providence to expect plants to journey from the top of the Veleta to an English garden without mortal ailment.

ENTIRE-LEAVED AND CRENATE-LEAVED SPECIES.

Since leaving *V. alpina*, I have been dealing exclusively with Violas whose leaves are always entire or at the most have a feeble and almost imperceptible notch or two. The remainder of the Melaniums have the leaves clearly and always crenate or toothed. This subsection includes many of the best-known Violas—*V. cornuta*, *V. calcarata*, *V. altaica*, *V. Orphanidis*, *V. Dubyana*, *V. gracilis*, and *V. tricolor*,

which I propose to take as my representatives of the succeeding seven groups. It is true that some others might be preferred as better known or more typical, for example *V. Munbyana* in place of *V. altaica*, *V. lutea* in place of *V. Dubyana*, and *V. elegantula* equally with *V. gracilis*; but those I have chosen show very special features of interest.

The Horned Violas.

43. *V. cornuta* L.—I am at a loss to know why *V. cornuta* is grouped with its two kindred as the Horned Viola, in contradistinction to the Spurred Violas (or the Calcaratas), except that the spur of the former is generally much longer and thinner, while that of the latter is short or long, fat or thin. Differences in length and thickness of a spur would seem to be a poor means of distinction; and there is a clear distinction in the stipules. The stipules of the former give the plant away at once—they are large, ovate or ovate-triangular, and only jagged, not deeply pinnately or digitately divided as in the true Calcaratas. In the numerous hybrids between *V. gracilis* and *V. cornuta* it has become nowadays difficult to detect a true *V. gracilis*: but the typical *V. gracilis* has the stipule pinnately divided with a long leaf-like middle segment and two or more much shorter segments, while the hybrids betray themselves by a stipule broader at the base and not at all divided to the midrib. *V. cornuta* needs no description here; but its distribution in nature is peculiar. It is mainly a Pyrenean plant, but has quite a number of outlying stations throughout the mountains of Spain, and only reappears on Mont Grammont above the Lake of Geneva, on Monte Senario near Florence, and on the Begunjšica in Northern Jugo-Slavia. The first and last of these three isolated stations are certain; the Italian one may be doubtful, or at least needs re-discovering. In the high mountains bordering the eastern end of the Black Sea, there is also *V. orthoceras*, which is a Cornuta elongated in almost all its parts, so that its stems are prostrate and the petals long and narrow, giving it a distinctive startled look, and the spur is perhaps longer than in any other Viola.

The Spurred Violas.

44. *V. calcarata* L.—The true Calcaratas are five in number; and though the type-species, which again has been so often described and is so well-known as to make repetition needless, is alpine, the others are plants of lower altitudes and are Southerners, mainly Mediterranean. An outlier is one from upwards of 3,000 feet in the Island of Palma in the Canaries—a tall, downy thing, up to 18 inches in height, with narrow leaves and violet flowers on long pedicels. Another one somewhat off the beaten track is a Corsican and Sardinian, peculiar to those two islands. It is in cultivation, but has for some quite unintelligible reason been mixed up with *V. cenisia*. There is not the slightest resemblance, except that *V. Bertolonii* is a dwarf plant and

has small, nearly round basal leaves, and the stipules have only one or two, and these sometimes rudimentary, lobes. Apart from these two, the group belongs to the Central and Western Alps, then, via the Ligurians, descends the length of Italy, takes in Sicily, and crosses to Greece. Throughout this long line it is natural that the different species run one into another, and, for example, in the Western Alps, where, towards the south, *V. calcarata* var. *Villarsiana* comes to an end and *V. heterophylla* sbsp. *Cavillieri* begins, I have found it quite beyond me to distinguish the two. Typical *V. calcarata* cannot be mistaken, neither can typical sbsp. *V. Cavillieri* from the Ligurians, but I should like to know why, as is the case, the yellow Calcarata of the Mont Cenis should be assigned to the latter rather than to the former. The type of the group is itself very variable in many a detail, for it is found from 5,000 to nearly 10,000 feet, and beginning in Bavaria and the Western Tyrol, it crosses through Switzerland to the frontier of France and Italy, and holds the frontier right down to the Col di Tenda. The colour of the flower also varies greatly. It is commonly purple, and on the Col du Mont Joli in Savoy the eye sees only an immense spread of unbroken purple to the horizon when it is in bloom; but on the Mont Cenis one is dazzled by large areas of varied colour of astonishing brilliance, for here it is purple, yellow or white, or all intermixed, with here and there shades of citron, deep gold, violet, lavender, purple and gold, and lavender and gold. The Italian and Greek Calcaratas are grouped under the collective name of *V. heterophylla* Bertol., and here it must be made definitely clear that this is not the *V. heterophylla* of the Cima Tombea in Northern Italy which usurped the name for long and is now differentiated as *V. Dubyana*—a plant itself strangely confused with *V. gracilis*, but that confusion also has been put right. *V. heterophylla* is a much more luxuriant plant than the type of the group, though in Southern Italy, at 6,000 feet, it takes a dwarf form. It is extremely variable, and a number of forms have been named, such as that called 'Imperatrix,' which is stated to be a magnificent Viola with very large flowers of very deep purple, hailing from the mountains on either side of the Straits between Italy and Sicily.

Representatives of the Calcaratas are found also in odd places. *V. calcarata* itself is found on the mountains of Leon in Central Spain, far away from its focal centre, just as the Spanish *V. cornuta* is found above the Lake of Geneva. *V. heterophylla* is found here and there in Algeria; but of more interest is the presence of *V. calcarata* on the mountains of Bosnia and Montenegro under the name of *V. Zoysii*. Previously regarded as a form of *V. calcarata*, it is now ranked as a species. I have not seen it, so refrain from expressing an opinion; but when we find that a purple form of the usually deep yellow *V. Zoysii* has been collected on the Dormitor mountain, it is at least possible to say that there is less distinction between *V. calcarata* and *V. Zoysii* than between even the tall southern forms of *V. calcarata* and *V. heterophylla*.

The Altai Violas.

45. *V. altaica* Ker Gawl.—The *altaica* group comprises some eight or more species, according as certain of them are ranked as subspecies or not. The group as a whole is distinguished from the Calcaratas by the long-petioled lower leaves and the broad upper leaves, as compared with the short-petioled basal leaves and narrow upper leaves of the other. The Altaicas begin in Northern Africa with the well-known *V. Munbyana*, which is not, as has been so often stated, found in Spain or in Greece, but is at home on some mountains of Algiers and Tunis. Despite its native latitude (and even there its highest altitude is only about 4,500 feet), *V. Munbyana* is so hardy in Kent that it continues to flower throughout the winter, and I have often seen its flowers sticking out of the snow, after the melting of which the plant is none the worse. It is valuable for its free-flowering habit, but the tone of its purple is not clear. Whether *V. Battandieri* is specifically distinct, I have never been able to decide in my own mind; but certain more luxuriant and altogether finer forms I had, with flowers of a clearer violet, seemed to me distinct, although one feature of *V. Battandieri*, the long, slender, acute and straight spur, appears in cultivation to become shorter, thicker and rather curved. From Africa the group crosses to Sicily, where the type species of *V. nebrodensis* is found on the mountains above 5,000 feet. The forms of *V. nebrodensis* are nearly as many as those of *V. heterophylla*. The type is very dwarf, the leaves seeming to form a rosette, and the flower is like that of *V. calcarata*, but with an even longer spur. A yellow, downy, broad-leaved form is found above Palermo, where also there is a large-flowered, pale violet form with shorter spur, very large stipules and other marks of its own. From Sicily we cross to the toe of Italy, and there find what is known in cultivation as *V. pseudo-gracilis*, a somewhat smaller version of the foregoing; and in Central Italy *V. Eugeniae* imitates an almost stemless Calcarata. Further east, Macedonia produces the tall *V. arsenica*, with large yellow flowers, and Armenia the dwarf *V. dichroa*, with large violet flowers, from very high altitudes near the snows. Finally, stretching from Armenia in a north-east direction over Asia to the Altai Mountains and Lake Baikal, there is *V. altaica* itself, with very large flowers of the most intense violet. In cultivation it is difficult to convince oneself that it is not a garden Pansy, as, apart from the size of the bloom, the plant takes on a very robust, almost obese, appearance. In nature, however, there are two distinct forms—one, the smaller, with leaves gradually narrowed into the petiole, leaves oblong, stipules more deeply divided (almost pinnate), and spur just shorter than the calyx; the other, the more luxuriant, with leaves larger and oval, contracted suddenly into the petiole, the stipules merely toothed, and the spur barely longer than the auricles. The former (sometimes known as *V. oreades*) belongs to the Crimea, Eastern Asia Minor and the Caucasus; the latter, the typical *V. altaica*, belongs to Central

Asia, along a line stretching from Turkestan north-eastwards to the Altai Mountains and beyond Lake Baikal. The maximum breadth of the bloom is recorded as 45 millimetres or 1¾ inch; and it is sometimes yellow, though the usual form is an intense violet. Despite its luxuriant nature, it is a denizen of alpine meadows and rocks from 5,000 to 13,000 feet. As usual in this genus, the two forms mentioned above are not clearly separated in nature one from another; but while the *oreades* form prevails on the near side of the Caucasus, and the type belongs to the northernmost area, there are intermediates in the districts between. It has often been considered that *V. altaica* was one of the principal progenitors of the modern garden Pansy. As to this I have myself no opinion except that, looking at the general appearance of *V. altaica* in bloom, one would immediately think this was so; but the Swedish botanist, WITTROCK ("Viola-Studier," II, p. 71), who made a most exhaustive study of the wild and cultivated varieties of *V. tricolor*, stated that, though reliable evidence existed to prove that *V. altaica* was cultivated in England from 1816, and though it is more than probable that it played a slight rôle in producing some of the Pansies of those days, yet it is a mistake to ascribe the real parentage of the Pansies to this species, as, apart from its large flowers, it has scarcely a single characteristic in common with the garden Pansies, and always seems to have been, as it still is, a great rarity in European gardens.

THE ORPHANIDIS GROUP.

46. *V. Orphanidis* Boiss.—We come now to a small group of Balkan Violas, with long prostrate stems, large, ovate, leaf-like, toothed or incised stipules, and short spur, from subalpine districts. *V. Orphanidis* might be taken from written descriptions to be akin to *V. cornuta*; but in actual appearance it is extremely distinct, not merely on account of its long stems lying flat along the ground, and there making a foot-round green pancake, but because also of its unique colour—a bright, pastel or "nouveau-art" shade of blue, just deeper than periwinkle. The flowers are of medium size, but make up for that by their numbers. I had it on a bank in the rock-garden in full sun in Kent; and I think it must have committed suicide that summer by overdoing the output of flowers. This rarity comes from Northern Greece and Montenegro.

THE VIOLA OF THE CIMA TOMBEA.

47. *V. Dubyana* Burnat.—It is difficult to choose a representative for this group, which includes *V. lutea* in its many forms and *V. splendida*, whose name often appears but about which nobody seems sure, but I choose *V. Dubyana* both for its botanical interest and for its great beauty. The group has erect stems, rather tall generally, and has the stipules digitately divided, with the middle segment not noticeably larger than the others. *V. Dubyana* was for long known as

V. heterophylla—a name good enough on account of its heterophyllous leaves, but naturally confused with the *V. heterophylla* with which I have already dealt, and which has a prior right to the name and is a very different Viola. It has also been confused, on the one hand with *V. valderia*, and on the other with *V. gracilis*. Many pages might be spent on the history of the disentanglement of these names; but it must suffice to say that *V. Dubyana*, as I saw it on the long topmost ridge of the Cima Tombea (near Lake Garda), is a very distinct and very beautiful Viola, with its two-colour forms of luminous violet and bright claret-purple. It makes a concise, six-inch-tall clump, and covers itself with bloom like some of the garden *gracilis-cornuta* hybrids. It has the wild, startled look of some of the natural Viola species, and its rounded lower leaves are hardly noticed against the upper narrow leaves and the much-divided stipules (with up to ten linear segments). There is an excellent photograph of it, with its almost grass-like appearance, by MALBY in "The English Rock Garden"; but there it is shown as growing among, or almost on rocks, whereas in nature it is found on bare earthy patches in among turf or at the edge of rough tracks—certainly in full soil. Though found as high as 6,800 feet, it is as much subalpine as alpine, and it grows in the Val di Ledro at quite low levels. A much easier place than the out-of-the-way Cima Tombea at which to get it would be the Gavardina alp (taking to the hills on the right as you go from Lake Garda towards Storo, the village which has traditional stories of the botanists who thence have ascended the Tombea); and its most western appearance is on the Grigna, above Lake Como, round a mountain refuge called the "Rifugio Escursioniste Milanesi," the Refuge of the Trippers from Milan.

Before leaving this group, it is almost essential to say something of *V. lutea* Huds., which probably I should have taken as representative. This (like *V. calcarata*) is remarkable for the wide range of its colour variations—deep yellow, pale yellow, whitish, pale purple, purple-violet, dense violet, or almost any of these mixed. Any good forms I have had deteriorated speedily; I do not know why, but in this, perhaps the most promiscuous of a promiscuous race, natural selection seems to produce numbers rather than quality. I have never seen the violet forms; yet these are generally found in Western Europe, especially France. The eastern form (*V. sudetica*, so called from the Sudeten range of hills on the northern frontier of Czecho-Slovakia) is invariably yellow; the stipules are rather pinnately divided, with a few short segments. The western forms, on the contrary, are generally some shade of blue; and the stems are more flexible and slender instead of being somewhat squat and firm; also, this (sbsp. *elegans*) has the stipules palmately divided, and the spur is longer. I give you what the experts say; yet in England, Scotland and Ireland, *V. lutea* seems always yellow, as in Teesdale, and the squat eastern form was collected, I think, on the Derbyshire highlands.

The True V. Gracilis.

48. *V. gracilis* s.s.—*V. gracilis* is the best-known representative of a small group of brilliantly coloured Violas, of which the second, *V. elegantula* Schott (better known as *V. bosniaca*) is nowadays hardly less common in gardens. The group is very similar to the last, except that the blooms are smaller, and the stipules are pinnately divided with a long, well-defined, leaf-like middle segment. *V. gracilis* has been the subject of great confusion, owing primarily to Boissier's error in giving the Greek Olympus, near Salonica, as its home. The Greek Olympian is a subspecies of *V. heterophylla* (the centre of whose distribution is Southern Italy); and as *V. Dubyana* of the Cima Tombea was confused with *V. heterophylla* on the one side and with *V. gracilis* on the other, while also *V. Dubyana* was confused with *V. valderia*, and *V. gracilis* with *V. calcarata*, here was a fine tangle for later botanists to unravel. In the true *V. gracilis* (whose "locus classicus" is the Olympus of Bithynia in Asia Minor, overlooking the station of Brusa on the railway not far from Constantinople), the stipules are densely downy, and are very deeply divided, almost or quite to the midrib, into from two to four on the outside and from one to three on the inside; while the leaves are oblong, gradually narrowed into a petiole of about equal length to the blade, and the lowermost leaves are broadly ovate or nearly round and abruptly narrowed into the petiole. All the leaves are blunt, crenate, and covered with short down. The yellow form, which I have not seen in cultivation, at least true to type, seems in nature to be as frequent as the violet; but it appears to be more frequent in the form subsp. *calycina*, which begins on Olympus but goes eastwards along the mountains south of the Black Sea (in the provinces of Paphlagonia and Pontus), while the violet form seems to spread westwards—at least, reputed specimens have been collected in Macedonia and even Albania. But the latter localities are, I imagine, barely established; and, again, *V. gracilis* has been reported, with herbarium specimens to support the fact, from Tibet.

V. bosniaca was so named in 1887 by Formanek, but in 1857 Schott had already described it as *V. elegantula*; and as Formanek was shaky about the matter and later gave it as *V. declinata* var. *bosniaca*—an obvious error—it seems necessary that the prior name should stand. It is not confined to Bosnia, but extends along the mountains, generally at subalpine levels, from Dalmatia to Albania. In nature it is rose, whitish, yellow, yellow and violet mixed, or red-violet. Only the red-violet forms seem to have come into gardens; and here there are good and bad colour forms, some being washy or dulled with magenta, others being a brilliant red-violet, more red than violet. I imagine the washy or magenta tints are due to hybridization with forms of *V. tricolor*; and this may also account for the fact that sometimes in gardens it appears to be an annual. There is also a form

which may be a hybrid between *V. elegantula* and *V. Munbyana*, which loses the effect of larger flowers in the lifeless tone of its magenta-violet.

The Heartsease Pansies.

49. *V. tricolor* L.—This is the greatest dragon in my path; not because too little, but, as I think, too much is published about it. In the Eu-tricolores there are at least thirteen species, and in the Kitaibelianae three more; while *V. tricolor* itself is divided into subspecies, varieties, forms and subforms, regarding which I can only recommend anyone who is interested to study Wittrock's book, a largish work devoted to *V. tricolor* alone, and written after numerous trials in a Swedish garden. To my mind, the distinction itself between one group and the other of the Tricolores is very thin—the Eu-tricolores having the spur barely longer than the auricles, and the middle segment of the stipule more or less leaf-like, while the Kitaibelianae have a spur clearly longer than the auricles and the middle segment of the stipule plainly leaf-like. Wittrock bases many of his forms and subforms on colour distinctions—which is like building the proverbial house upon very shifting sands. I have already referred to the numerous colour variations in *V. calcarata*; but they are nothing to those in the Tricolor group. Here we have white blooms, whitish and cream; yellow, pale yellow, sulphur, citron; lilac, pale lilac, light blue, blue, purple, purple-violet, violet and black-violet. The colour often changes with the age of the flower; the spur is frequently different, *e.g.* violet when the flower is yellow; and the two upper, or the four upper, or the three lower petals may be different from the others. Colour apart, it is extremely difficult to arrive at the main distinguishing characters of the group. The stem in one species is almost lacking, and in others it may be anything up to 2 feet or more; it is generally angled, but it may be decumbent, ascending or erect, and simple or branching, with branches few or numerous. The leaves are generally oblong or lanceolate but sometimes spathulate, always crenate or serrate or incised, and attenuated into a long or short petiole; but the upper leaves are narrower than the lower, while the basal leaves are often cordate, sometimes obovate or even round, and occasionally forming almost a rosette. The stipules are in general palmately divided, with the median lobe broad and toothed, but may be pinnate or even pectinate or again lyrate, while in some forms there is only one linear-oblong jag, as it might be in the Cenisia group. The flowers vary from being minute to relatively large, and are occasionally scented; the petals are normally broad, but may be quite narrow, while the upper ones are normally erect but in some species are divergent, showing the green sepals between. The purple striations on the petals may be distinct or indistinct or nil. The pedicels are long or short, always axillary, with generally two bracts, the bracts being usually above the middle of the pedicel, sometimes at the curve, sometimes just beneath the auricles, and sometimes non-existent. The sepals

are usually triangularly ovate, acute and ciliate, and sometimes not all of equal length. The auricles are generally conspicuous, but sometimes short; truncate or round, toothed or not. The spur varies in length, but always, I imagine, exceeds the auricles. The plant as a whole may be glabrous or pubescent, and in at least one instance woolly. *V. tricolor*, taken as a collective species, is generally regarded as annual; but *V. arvensis* (sometimes), *V. alpestris* (generally), *V. saxatilis* and *V. caespitosa* (always) appear to be perennial.

The Area of the Tricolour Pansies.

The distribution of the group is equally puzzling. The English forms are the typical *V. tricolor*, and also its variety *maritima* (*V. Curtisii* or *V. subulosa*), and *V. arvensis*. In these notes, I have studiously avoided the Jordanian classification, though Jordan's names are frequently used in England. To my mind, to divide the various forms of *V. arvensis* into *V. agrestis*, *V. confinis*, *V. contempta*, *V. obtusifolia*, *V. ruralis*, *V. segetalis*, *V. variata*, etc., is as little illuminating as Wittrock's attempt to break up *V. tricolor* (type) into such ponderosities as *V. tricolor* sbsp. *genuina* f. *auropetala* sf. *subtypica*, or f. *roseola* sf. *erubescens*. To indicate exactly the world-distribution of the group would take many pages of this Journal; so I will try to cover the ground roughly by taking instances here and there. First, on the mountains of Portugal, as on the Serra da Estrella, there is the yellow and relatively large-flowered *V. caespitosa*, whose name is self-explanatory. On the subalps of Andalucia in the south of Spain, as on the Sierra de la Nieve, there is the tiny, single- and frail-stemmed, yellow *V. Demetria*, so tiny and so perfect as to make one laugh that anything so tiny could be so perfectly formed a Viola. (I think the honour of producing the smallest species of the race belongs to Stewart Island, south of New Zealand.) In the Pyrenees is the taller, one- or many-stemmed *V. Kitaibeliana*, with pale yellow flowers (sometimes flushed with violet) on long pedicels. This has very many forms, to which as many names have been given, and its area is most quickly described as the countries lying on either side of a straight line drawn from Central Portugal to the Caucasus, with sporadic appearances near Oran in Algeria, and again to the east of the line, in Persia. A similar line extending from Morocco to Armenia, the centre of which might be the peak of Mt. Ida on Crete, roughly gives the area of the small and completely woolly *V. parvula*, with usually white flowers, shaded to blue towards the base of the petals. In the Western Alps of France there starts the *V. alpestris* group, yellow or violet or these mixed. The type plant belongs to this area, but the group ranges over the high or middle mountains of Central Europe, with an excursion over the Balkan Peninsula. In Austria it takes the name of *V. polychroma*, a rather poor, weedy, bluish thing; in Transylvania it becomes *V. pseudo-lutea*; in Macedonia, *V. macedonica*; in Greece, *V. aetolica*, a tall, yellow Viola not unlike *V. lutea*,

with a still larger-flowered form with the two upper petals generally violet, and unequal sepals. These are all best regarded as subspecies, and within the subspecies there are still others of purely local habitat, such as *V. orbelica*, a densely pubescent plant from Mte. Rilo in Bulgaria, and *V. pindicola* from certain woods in Macedonia.

The peak of Mt. Ida on Crete and the woods of Government House on Troodos in Cyprus are the most western localities of *V. Heldreichiana*, a very dwarf, almost stemless rock plant, with small pale-blue flowers on long pedicels, which from here extends into Greece and Asia Minor, taking, again, varying local forms to which names, such as *V. Mercurii*, have been given. The Island of Thasos, half-way between Salonica and Gallipoli, grows in its fields the large-flowered yellow-and-violet *V. Thasia*, which might be taken to be an annual form of *V. alpestris*. The perennial, generally yellow *V. saxatilis* ranges from the Crimea to the Caucasus. From among the crops near Aleppo in Syria comes the slender, violet *V. pentadactyla*, very near to *V. arvensis*. The woolly *V. modesta*, with violet flowers and no bracts on the pedicel, is centred in Kurdistan, stretching into Asia Minor on the one side and into Persia on the other, with probably a yellow form (under the name of *V. tenella*) on the Lebanon above Damascus. The white-flowered and bractless *V. occulta* probably has its centre on the high plain of Teheran, the capital of Persia, but it has an immense area, from Asia Minor in the west, and Samaria in Palestine in the south, to the Altai Mountains in Siberia. Finally, there is the black-flowered *V. atro-violacea*, reminiscent of the garden Viola called ' Bowles's Black,' from sub-alpine woods on the Altai.

So far then, the area of the Tricolores appears to be fairly simple—along two lines, both beginning in Portugal, one stretching to the Altai, the other to Palestine. I have not, however, yet dealt with the two most widely spread of all, and the two commonest and best known, *V. tricolor* and *V. arvensis*. The same radial lines would serve to indicate their distribution; but neither of them goes down into Palestine, and while the latter extends its course eastwards to the banks of the Euphrates in Mesopotamia, *V. tricolor* takes a giant's leap to the Himalaya (as near Darjeeling), and to the Nilgiris in the South of India. It has also been recorded on different occasions in Brazil, and in Patagonia in the extreme south of South America; but, without more knowledge, one is almost forced to regard these as errors or introductions. *V. arvensis* also is to be found on the Victoria Peak at Hong Kong—surely an introduction; and it has undoubtedly been introduced into N. America, where it is common in Newfoundland and Canada, and is probably spreading southwards through the cultivated fields, having appeared here and there all the way to North Carolina.

Yet there are two undeniable natives of the Melanium Section on the American Continent—one, *V. Rafinesquii*, from fields and open woods from New York to Texas, once taken to have been introduced (being probably confused with *V. arvensis*), but later accepted as the only American representative of the Pansy of the Old World, until *V. andina*,

another *arvensis* cousin, was found over the very high Andes of Ecuador, Colombia and Central Chile. This, found as high as 12,350 feet, is, I imagine, the most alpine of the section. It used to be given as *V. tricolor*, but is more akin to *V. Rafinesquii* of the U.S.A. or to *V. arvensis* (the records of *V. tricolor* from Brazil and Patagonia may be due to the same confusion). Neither the North nor the South American is of interest other than as the only New World representatives of the Pansy.

The habitats of the Tricolores are as various as their habits and geographical distribution. As I have already said, the highest known station is at 12,350 feet in the Andes; in the Sierra Nevada, in the South of Spain, they ascend to 8,500 feet; and in Morocco they are found at about 5,200 feet, the upper limit of the Atlantic Cedar. They are also found on the seashore of the French Riviera, and in between these extreme limits they inhabit lowland fields and edges of paths, orchards, meadows, rocky slopes, high alpine screes, shrubberies and woods under pine trees or oaks, at every altitude and in sandy or argillaceous soils.

Two Paradoxical Violas.

50. *V. rothomagensis* Desf.—The last of the Melaniums are two Violas, one well and the other hardly known, whose exact place in the genus is still to be determined. It is doubtful, as is stated in "Die Natürlichen Pflanzenfamilien," whether *V. rothomagensis* should be placed with the Luteae or the Tricolores. It is native only to north-west France, as near Rouen and Paris, growing on limestone slopes. It grows into a clump of at most 8 inches, carrying over a long period numerous medium-sized violet or yellow flowers with full, almost rounded petals. The colour is not very clear, but the plant is common in gardens.

51. *V. paradoxa* Lowe.—This is given by the foregoing authority a place of its own in the Melanium section, perhaps between the Calcaratae and the Orphanideae. Its habit of prostrate growth recalls that of *V. Orphanidis*, the long stems of 20 inches or so lying along the ground, with flowers of blue-mauve and yellow so numerous as to make a flat circle of colour barely interrupted by the green of the leaves. It was sent to me once under the name of *V. rhodopaea*, though not from the Balkans, and thus by a curious freak this very rare and beautiful plant of the island of Madeira, where it grows at 5,200 feet on the "Peak of the Muleteers" (Monte Pico dos Arrieros), came into my possession. But not for long; for either it is annual (though stated to be perennial), or it flowered itself to death, or, most likely, I made the mistake of putting it where the soil was much too rich before I was aware that it is purely a rock plant.

(*To be continued.*)

THE USE OF COLD FRAMES.

By F. Jordan, V.M.H.

[Read February 9, 1932; M. Fenwick, Esq., in the Chair.]

Garden frames are amongst the oldest of garden appliances, but until recently little improvement was made in their construction.

They are of diverse forms, from the humble cloche and the ordinary light frame to the more substantial erections on bricks. The uses of ordinary frames are so many and varied that only those accustomed to raise plants from seeds and cuttings in large numbers can tell how varied are the purposes to which they may be put.

As a rule, cold frames are portable garden structures, which should never be empty. They are especially useful during the winter and early spring months for supplying large quantities of salads, annuals, etc., for bedding, and for forwarding many plants for stocking the kitchen garden.

Cold frames may now be bought in all shapes and sizes. Possibly the frame most in general use is the one-, two-, or three-light lean-to frame, measuring about 6 by 4 feet or 8 by 6 feet. Commercial growers use this frame in large numbers for such plants as Violets, annuals, salads, etc.

The three-quarter span gives more light, is more easily ventilated, and has many advantages over the lean-to for growing plants. All kinds of frames have been much improved in recent years in regard to construction, ventilation, and lightness, so that many are now equal to a small span-roofed house. There is such a wide choice that all of us may find one to our fancy.

I have always favoured most a span-roofed frame, and where expense is not the chief object, this is one of the most popular and best types made. Sashes are easily removed; ventilation and convenience for watering are ample. These frames vary in size from 6 to 12 feet wide to any length required.

The largest of these is best treated as a small house, and may be placed on turf walls or permanently on brick walls or iron standards. It makes an ideal house for Alpines. The increase and popularity of rock plants, and the many other hardy plants which are shown in such large numbers and so successfully in the early months of the year at the Royal Horticultural Society's meetings, serve to illustrate the great value of these cold frames or cold pits.

Many of the most striking and beautiful of these hardy plants may soon be spoilt by coddling; but in a cold frame or cold house, carefully ventilated and protected from the elements, they are beautiful objects when in bloom.

Lovers of Alpine plants, who may have tried in vain to get good

flowers of many plants not quite hardy enough in the open during severe weather, will see at once the advantage of a little protection which can be afforded by such a house as this. Cold frames may also be used for many other purposes, and for growing a great variety of plants that merely need protection from frosts.

Cloches.—Commercial growers and large private growers make extensive use of cloches at all seasons of the year. My object is to try to show the amateur and small grower the value of these simple garden appliances. Cloches are by far the cheapest form of glass protection for the small grower. They take up little room and are easily stored or assembled. They are made in all sizes, fit for covering an individual plant or covering beds or continuous rows of seeds and plants, and when fitted with ends are miniature cold frames. They last for years with ordinary care, and why more use is not made of these simple appliances is difficult to understand. Seeds may be sown earlier in spring, either where they are to remain, or for transplanting into any other part of the garden.

Seeds sown under cloches are safe from birds and insects. Therefore much less seed is required, as germination is sure, and everyone knows the value of thin sowing of many annuals where they are to remain.

In light soils peas, beans, lettuce, etc., can be sown in the autumn with every chance of success. By their use crops are much improved and hastened forward according to the season, while on heavy, wet, cold soils, where autumn sowing is always difficult, they are even more valuable.

Important points, which must never be overlooked, are thorough preparation of the ground and thin sowing. On cold, wet soils in early spring cover the rows or beds a week or fortnight in advance of sowing. This will dry the surface and warm the soil.

Seeds.—Many tender annuals for early supplies need protection. Many of them when well done are most effective, decorative plants. Sometimes they are called weedy. This term may be applicable to some, but few would think of applying it to the beautiful examples produced from seed by the market growers. They devote large spaces to special subjects, and thus secure more uniform treatment than private growers, who often have to grow a collection of things in one house, can give.

Cool, light, well-ventilated pits or frames are very suitable for growing many of these annual plants; possibly one of the most prolific causes of failure is treating these plants too tenderly, for they then become drawn, the stems are unable to support the flowers, which no amount of tying can remedy.

Never attempt to force or hurry the growths of seeds or plants unduly. In sowing seeds the usual mistake is in putting them in too deep in the soil; most small seeds will sprout as well on the surface as under it, and for very small seeds it is generally better to water before than after sowing.

In sowing seeds, wooden boxes as a rule are best, the soil being more easily kept uniformly moist. The proper treatment of the seed-boxes or beds is of the greatest importance. Even when covered with a frame, tender seedlings cannot be expected to grow on unprepared ground.

Many of our finest hardy perennials are easily raised from seed, like the ordinary annuals, and those who require large stocks find this the most rapid way of producing them. Many that flower and ripen their seed early may be successfully grown on sunny borders. All, however, are safe when sown in cold frames, and choice and scarce varieties should always be sown under protection.

Propagation.—Perhaps the mainspring of success in growing many hardy plants is careful propagation, the importance of which is not always fully recognized.

Drainage, frames, pots, and compost should always be fresh, clean, and sweet. Ventilation and watering are all points of importance. Careful attention to these minor details goes a long way towards successful propagation. Damping, once it commences, soon destroys a batch of cuttings. Stirring the surface, careful ventilation, and dusting with wood ashes or sand will often save a great deal of vexation and disappointment when done in time. A great point is to avoid exposing either root cuttings or tops, as they suffer quickly if exposed in a dry place.

Cuttings and seeds should never be allowed to suffer from want of water. The other extreme must also be avoided. Plants of tender varieties for stock or seeds, as they pass out of flower, should have a cloche placed over them. By careful selection, thinning the seed-pods, removing weak growths, healthier and stronger seeds and cuttings are secured that will root more freely under proper treatment. By continuous propagation many plants lose their vigour. Hollyhocks are a striking example.

Frosts.—Those who endeavour to preserve plants in an unheated house or frame through the winter always find how difficult it is, especially during a long spell of severe weather. With frost and damp the grower has two powerful forces to fight against, and these dangers can only be met by all the forces at his command. Much depends upon the soil, situation and aspect of the frames, which should always be placed in a light and sheltered position where all available sun can reach them. Much may be done by arranging the tenderest plants at the back of the frame to mitigate the effects of frost. Always allow the soil in the pots or beds to become as dry as possible while frost is about. By this means the effect of frost upon the roots is reduced to a minimum.

Good dry coverings of the tops and sides of frames are better than oil lamps for plants that only need protection from frost. All plants winter best where water drains away quickly; in ordinary weather they do not mind exposure.

Ventilation.—Depend upon it, one of the great secrets of successful

management of cold frames during winter is abundance of air, always admitting it on the opposite side from where the wind blows cold.

A close, humid atmosphere is fatal to many hardy plants, seeds, and cuttings. Many people appear to think that unless a frame is kept close in cold weather and air excluded, the plants are sure to suffer. Cold winds and damp can often be guarded against, but fogs in and near large towns often defy remedy and find their way into every crevice of a cold frame or house.

Many keep frames closed in cold weather when they would be better open. Plenty of dry air is the life of these plants. By all means shut them up in foggy or wet, muggy weather.

Cleanliness.—It is a good plan to change the plants occasionally and stir the surface soil, removing dead parts, decaying leaves, etc. By these simple precautions a great many plants can be carried through the winter with safety.

At the beginning of the year in favourable weather there is much to be done outside, but in mild weather time should be found to overhaul the occupants of the frames.

All plants and cuttings should be examined for insects and fungi, and weeds removed. Cleanliness is absolutely necessary for the health and vigour of the plants. As a rule, stirring the surface sweetens and aerates the soil, and is much better than watering in the early months of the year.

Vegetables and Salads.—Although I cannot go much into their cultural details, avoid the craving for size and always cut vegetables and salads fresh and young, and select the best varieties of everything. They take no more growing than poor ones.

Thoroughly prepare the ground and grow them well, which is the best of all preventives against attacks of insects and other ground pests. The thirst for knowledge and facilities for obtaining it, with the great improvement in varieties and public taste, have all contributed to the development of these plants. Our hybridists are still improving and adding new varieties. Early vegetables and salads intended for the Paris markets are grown in full sun assisted by some form of glass protection. Many of them are a lesson in good culture.

Possibly small salads, such as lettuce, endive, chicory, dandelion, and mustard and cress, are more appreciated during the winter and early spring months than early vegetables for cooking; all of these will thrive in almost any kind of soil, but, as with other plants, sweet rich soil produces the best.

Those who have plenty of fermenting material may force a good variety of early spring salads and vegetables.

Of the many contrivances adapted for forwarding plants and vegetables, none gives better returns than an open-air hot-bed formed in February or March. By this means it is possible to raise a good supply of early salads, such as the above, and sufficient lettuce, cauliflowers, Brussels sprouts, celery, etc., to stock a small garden.

The value of strong early plants, carefully hardened off, of the different vegetables cannot well be overestimated. These alone more than compensate for the labour and expense incurred. Bulbs and other plants may be brought forward. Everyone should try and adopt some simple method to produce early supplies that are so much appreciated.

Cold frames without hot-beds, placed on some warm border, will produce plants much in advance of those sown in the ordinary way in the open garden. Many other vegetables may be forwarded under the above conditions, such as asparagus, seakale, potatos, carrots, beetroots, beans, peas, tomatos, and also strawberries. Small sowings of endive, lettuce, chicory, etc., made in summer and autumn in a cold frame, will produce plants much in advance of those sown in the spring.

If our supplies of early salads, etc., are not restricted from other countries, their price will be increased. No doubt our market growers will take advantage of the opportunity offered them to produce more. Private growers should also make more and better use of cold frames or other forms of glass protection for home supplies.

SMALL GREENHOUSES AND THEIR USES.

By W. Hales, A.L.S.

[Read March 8, 1932; Sir John Du Cane in the Chair.]

When I was asked to lecture on the uses of a greenhouse, I confess that I wondered if it were necessary to deal with a subject which is more or less determined by the interests of the owners of greenhouses themselves. There may be some amateur owners of greenhouses, however, among our Fellows who feel that for some reason or other they are not making as much use of their greenhouses as they would like, or who need guidance on some point in their management, and it is to such that my remarks are especially directed.

We learn from Lady Cecil's "History of Gardening in England" that as early as the sixteenth century the idea of affording protection to tender plants was being discussed by various writers, notably by Sir Hugh Platt in the second part of "The Garden of Eden," printed in 1660, where he writes, "I have known Mr. Jacob of the Glasse-house, to have carnations all the winter by the benefit of a room that was near fire." This idea of protecting tender plants continued to develop, and in the seventeenth century we read of houses being built for this purpose, first in the Oxford Botanic Gardens, and shortly afterwards in the Chelsea Physic Garden.

The protection of large plants of exotic evergreens during the winter, such as myrtles, bays, pomegranates, etc., gave rise to the orangery, which was the greenhouse of the eighteenth century. The modern occupants of greenhouses which demand more light were then unknown, or few in number. The orangery was usually placed near the dwelling-house, to which it conformed in architectural design, and even to this day we often see attempts to imitate these heavy buildings, which cut off much of the light which is so necessary for healthy plant growth, more especially in the dark winter months.

Plenty of light and air are essential conditions which must be kept in view when a modern greenhouse is under construction, and this being so, it follows that generally the best position for a greenhouse is an open one set up to the south or south-west. In small gardens, owing to restricted space, it is often necessary to place the greenhouse near some other building, but even then the chief consideration should be to ensure that it be situated so as to get the maximum light and air at all seasons of the year.

When a greenhouse is being built, it is always cheapest in the end to have the work carried out as well as possible, and at the present day there are very reliable firms who have made a speciality of this work, and who are always ready to send their representatives

to give advice, make plans, and prepare estimates. The would-be owner of a greenhouse having made up his mind as to what he intends to grow in it, can then have it constructed accordingly. If the most is to be got out of a greenhouse, and it is of sufficient size, it is desirable to have it divided into two sections, so that one can be moister and warmer than the other. The moister part is used for the soft-wooded greenhouse plants, and the drier and cooler for hard-wooded plants and plants that are in flower, since plants always last longer in flower when the atmospheric moisture is rather less than that which usually suits the plants best during their growth before flowering.

The use and enjoyment of a greenhouse will depend very largely on the cultivator making himself conversant with the particular plants he is growing, and their cultural requirements. These will, of course, vary according to whether the plant is growing actively, maturing its growth previous to flowering, or is in the flowering, or resting stage. For example, many hard-wooded plants such as Ericas, the so-called Indian Azaleas, Boronias, Baueras, Genistas, Pimeleas, Aotus, Acacias, and Chorizemas, after they have been pruned back and potted and are making their growth, enjoy more warmth and atmospheric moisture than is good for them in the later stages of their development. The aim with most hard-wooded plants should be to encourage early rooting and growth soon after they have been pruned back and potted. Then as growth increases, give more ventilation and exposure to direct sunlight, to ensure that the growth made is thoroughly ripened, otherwise the flowering will be poor or indifferent.

One cannot insist too strongly on the fact that plants growing in greenhouses are growing under artificial conditions, and, since this is so, are dependent on the cultivator for the regulation of these conditions. If this is not understood or realized, failure to get the most out of your greenhouse is certain to follow.

We collect together in greenhouses plants from all parts of the globe, and often forget that the conditions in these various parts are not all alike, and it is really marvellous how often and how well the plants succeed. Generally, however, much the best results are obtained when a house can be devoted to a single species, or the same kind of plant.

Most of those, however, who possess greenhouses, want to have as large a variety as possible of different kinds of plants growing all mixed together, and when this is the case the needs of each individual must be studied.

In all plants there is what we might call a profit-and-loss account —an intake into the plant of food material, and an outgoing of surplus water and gases.

On the profit side there is the need of the plant to get food material for building up its structure, and finally producing its flowers and fruits, or maybe reserve material for storing in bulbs, tubers, etc.,

for future use. This profit side is supplied partly by the food materials dissolved in the water taken in by the roots from the soil, and partly from the carbon dioxide taken in by the leaves from the atmosphere, and it should be the object of the cultivator to strike a balance between these two accounts.

The food materials taken in by the roots from the soil pass into the leaves or—as in cacti—other green parts of the plants, where, under the influence of sunlight, certain chemical changes take place which make them available as organized food material, either for the immediate growing requirements of the plant or for storage as reserve food material.

Now if this supply of potential food material is not forthcoming, either through wrong aeration of the soil, lack of fresh air, or inadequate intensity of light and temperature, the several essential functions of the plant are interfered with, and badly grown plants are the result. The control of these several essential factors is more or less in the hands of the cultivator, and neglect to supply one or other of them soon upsets the balance of the plants, and poor results follow.

The first thing, then, to pay attention to is to supply a good medium in which the plants are to grow, so that proper aeration of the soil is secured. This encourages healthy root growth and at the same time allows the free passage of water, with its dissolved food-substances, through the soil, where it is brought into contact with the roots of the plants by which it is absorbed. It also allows the free passage of oxygen, which is an absolute necessity for healthy root action.

The soil medium will, of course, vary with the kind of plant we are growing, but it must allow at all times free passage for water and air. In greenhouses water has, of course, to be given artificially, and it is safe to say that more plants are reduced to ill-health or killed outright through carelessness in giving water than from any other cause. There are some plants, such as ferns and most of the hard-wooded plants like Ericas, Indian Azaleas, and Boronias, that must never get so dry before water is given that they flag: but with most plants, if the soil never reaches a certain degree of dryness almost approaching flagging, healthy root action is hindered, and it is much safer to err by slightly under-watering than by over-watering, particularly in the winter months when the plant's activities are slowed down. It is really remarkable how small is the amount of water needed by certain plants, and most plants make better growth if there is only a small film of water available for their roots. On the other hand, if the watering is too heavy, and the soil is kept at saturation-point, its porosity is soon destroyed, free oxygen is excluded, the roots are asphyxiated, and the plants become sickly and unhealthy and an easy prey to pests of all kinds.

It is in the damp, dark days of the winter months that the greatest care is necessary in giving water. Moreover, the intensity of light is often not sufficient for photosynthesis to take place; the amount of

fresh air admitted to the greenhouse is reduced because of the external temperature; and often at this time the moisture content of the greenhouse will increase so as to render transpiration almost negligible. When the plants are not transpiring the water-supply at the roots must be reduced if the soil texture is not to be destroyed. During the bright, warm days of spring and summer the danger from over-watering is not so great, the activities of the plants being greater. More water is transpired from the leaves, and more is needed to take its place in the plant. But even in summer it is better to err slightly by under-watering than by over-watering.

Fresh air is necessary at all seasons for plants growing in greenhouses. It is from this that plants obtain their carbon dioxide, which is taken into the leaves, where, after certain chemical changes under the influence of sunlight, the carbon is used to build up the body of the plant and its flowers, for reserve materials to be stored in the plant for future use, and for a supply of energy. The regulation of this supply of fresh air to greenhouses is under the control of the cultivator, who must learn from observation how and when to ventilate. The spring months, with their fluctuating changes in outside temperature, are very trying periods for ventilating. Provided, however, there is sufficient atmospheric moisture in the house, since most plants are at this time growing actively, a few degrees' higher temperature will do less harm than opening the ventilators too wide to admit cold draughts of air from the outside.

We now come to the consideration of the "intensity of light," which is another factor which has sometimes to be controlled by the cultivator. Sunlight, either direct or diffused, is necessary, otherwise the various chemical functions cannot take place in the plant, and you get drawn, anæmic plants.

There are, however, many plants which we grow in greenhouses which suffer if in light of too great intensity, especially in the spring and early summer, when their growth is soft and sappy. Intensity of light is best regulated by fixing on the outsides of the houses movable blinds which can be lowered when occasion demands, and can be easily removed again when not needed. It is always a mistake to shade too heavily, and to keep the blinds down too late in the afternoon, when, if the weather is very bright, the houses can have their floors and stages damped down. This will increase the atmospheric moisture and counteract any increase in temperature which would follow the removal of the shading. Some plants, such as ferns, grow with a much less intensity of light, and for them a permanent shade can be put on the outside of the glass in the spring; but, generally speaking, movable blinds, if more costly, are more satisfactory.

Nearly all plants have what is known as their optimum and minimum temperatures, and it is within the limits of these that their best growth is made. I have indicated how temperature may be partly controlled by ventilation, but it is also necessary for a good many months of the year to use artificial heat to keep a sufficiently high temperature for most greenhouse plants, and this is done by some system of heating

by hot water pipes in the house connected to an outside boiler. There are various types of boilers now on the market, which are very economical and easy to manage and will maintain the requisite amount of heat.

Too often the amateur errs in trying to keep the same temperature for both day and night, whereas a normal fall at night of 7 or 8 degrees from the day temperature would keep his plants more healthy. Too high a night temperature can often do much harm, especially in severe weather. A slight reduction in temperature, coupled with a drier atmosphere, is an advantage in dark, foggy weather.

Insect pests in greenhouses, for which a sharp look-out must always be kept, can be controlled by fumigation or by the proper use of the syringe. There are so many safe fumigants on the market now that it can well be left to the owner of a greenhouse to make his choice; but never put off fumigation until the insect pests have got the upper hand. It is better to act on the principle that a slight periodical fumigation is more effectual and less dangerous than a heavy dose, and that prevention is better than cure. Always remember, too, that soft growth, especially in early spring, is more likely to suffer injury through fumigating than more mature growth. The best time to fumigate is late evening, after sundown.

In greenhouses there should either be a permanent case or, if not a permanent case, a movable frame, in which to propagate cuttings, as this work is one of the most fascinating of all gardening operations, and one of the most important. There are many hardy ligneous plants which can be propagated by layers or cuttings in the open ground, but it is the greenhouse which supplies the only means of ready propagation for a vast number of garden plants. A case enables one to maintain an equable temperature and moisture until rooting has taken place in these cuttings, which would soon wither and flag if left to the ordinary conditions of the greenhouse.

A cutting is any portion (save seed) of a plant which can be used for the purpose of increasing its numbers. It may be a part of a shoot or branch, a leaf or a root which will give rise to adventitious roots and buds when placed under suitable conditions and which ultimately develops into a plant.

The cuttings will give rise to individual plants resembling in all characters the parent plant, and, on this account, this is one of the commonest methods of propagation—in fact, the only safe method for many garden plants of hybrid origin.

Cuttings should always be taken from healthy plants, and require to be of a certain age and size, which will vary according to the kind of plant. They must be inserted in a suitable rooting medium, and afterwards kept under regulated conditions of heat and moisture, which again vary according to the kind of plant. For example, cuttings of most succulent plants must not have the same conditions as those needed for soft-wooded plants. Succulent plants have a greater water content and provision in themselves for slowing down the loss of water by transpiration, and therefore do not need the

protection of a case or frame such as is necessary for plants that lose their water rapidly and would "wilt" without such protection.

It is the regulation of the conditions of heat, moisture, and light, which the propagator has more under his control when the cuttings are in a closed case, that makes for success in rooting the cuttings of so many different kinds of plants.

In preparing cuttings always use a sharp knife, and make a clean cut, in shoots, just below the node or part of the stem where the leaf springs from, and remove some of the lower leaves.

Many hard-wooded plants, such as Ericas, Epacrids, Acacias, Genistas, and Boronias, will give much better cuttings, more likely to root, if the plants from which they are to be taken are given a slightly higher temperature than normal for a few weeks before the cuttings are made.

The soil in which the cuttings are best rooted should be of the same type as that in which the plants normally grow, but it must be finely sifted and have a larger amount of sand mixed with it, so that there is free aeration of the soil and any excess of water can easily pass through.

Before an ordinary cutting has formed roots it has only a limited surface by which to absorb water to take the place of that which is transpired, and the endeavour should be to maintain, as nearly as possible, a balance of profit and loss by keeping a humid atmosphere in the propagating case. This humidity, however, must be carefully watched so that there is not an undue excess, otherwise "damping off" of the cuttings, due to the growth of a fungus, is sure to follow. It is therefore necessary at least once each day to wipe off from the glass of the propagating case any surplus moisture that has collected there, and to leave the case exposed to the free air of the greenhouse for at least half an hour. At this time the cuttings must be looked over and any decayed leaves removed, otherwise they are liable to cause others to decay. As soon as the cuttings are rooted they should be given more air to harden them off before finally exposing them to the full conditions of the house.

Types of Cuttings.

Leaf Cuttings.

There are many plants that can be propagated by their leaves, roots and buds being formed either from parts of the leaf blade, or at the base of the petiole. Begonias of the Rex type, Gloxinias, and other Gesnerads are examples of the former, and Begonia de Lorraine and Saintpaulia are examples of the latter.

For this purpose it is best to take leaves which are neither too young nor too old, but are full grown, then insert the petiole in an open soil with the leaf lying flat on the surface. Plants will soon arise from the veins of the leaves, or the base of the petiole, as the case may be. In Bryophyllum the young plants arise from the crenations of

the leaf margin. These young plants, when of sufficient size, can be potted up separately and grown on in the usual way.

Some bulbous plants, such as Lachenalias, are often increased by leaf cuttings, which, when treated in the way described, form small bulbils on their leaves.

Root Cuttings.

Propagation by root cuttings is another easy way of increasing the stock of some plants, and is, in fact, the only way for plants like the hybrid Verbascums, which do not come true from seed. It is also a common method with other hardy plants, such as Romneya, Statice, Seakale, etc. Pieces of their roots are cut into short lengths, and either laid flat or inserted with their apical ends just below the surface of a suitable compost, when buds soon form, which usually grow into plants resembling the parent plant. I say usually, because there are some hybrid plants, like Bouvardias and Pelargoniums, which, through an inversion of their tissue, give rise to plants of another variety. Generally speaking, however, the resulting plant is a counterpart of the parent from which the cutting was taken.

The method of propagation by root-cuttings is used to increase the stock of some of the larger Sundews or Droseras, and gives strong plants much quicker than can be obtained from seedlings. Portions of the strongest roots are cut into pieces of about an inch long, and put into a mixture of chopped Sphagnum moss to which has been added sifted leaf-soil and sand, then placed under warm, moist conditions; in a few weeks shoots will arise from them, and they can then be potted up into the receptacles in which they are to grow.

Bulbs and Corms.

There are some bulbs and corms which have only one growing point, and therefore do not increase in numbers. It may, however, be desirable to get an increased stock of one of these, and then it is necessary to destroy the growing point by cutting it out, and this makes the bulb produce lateral buds at the base. If a bulb has a solid base it may be cut across the base and small bulbs are formed along the severed parts. This is the common method used for propagating Hyacinths and strong bulbs of Crinums, and, in fact, any bulb which has a solid base.

Corms, like Caladium and other Aroids, usually have several buds springing from the top of the corm, and these can be increased by cutting the corms into sections with a bud on each section.

This method of propagating by "eyes" is also used for double tuberous Begonias and plants that have creeping rootstocks, like Nymphæas. A small portion of the rootstock, with an eye attached, is cut off and placed under suitable conditions for growth. The same method is used extensively for propagating vines from the "eyes" or buds on the branches.

There are also the vegetative methods of increasing many plants

by grafting, for which a greenhouse is necessary. The hybrid Rhododendrons, for example, are often increased by grafting on to the stock of the common *Rhododendron ponticum*. Other plants, like Clematis, have small portions grafted on to the roots of the common 'Travellers' Joy.' The value of a greenhouse for the purpose of vegetative propagation is inexhaustible, and, at the same time, of never-ending interest.

I scarcely need to refer to the value of the greenhouse for the purpose of raising early seedlings of both flowering plants and vegetables. Yet I am afraid not half enough use is made of this opportunity for raising seedlings not only of greenhouse plants themselves, but also of many beautiful half-hardy annuals, so as to have good, sturdy plants to put in the open as soon as weather permits, which is a great asset, especially in cold districts.

The chief points in raising seedlings are: sow thinly in a good open compost; never let the soil get too wet or too dry; and transplant most seedlings as soon as they are large enough to handle and before they get drawn up through overcrowding. It is possible to grow good flowering plants of Gloxinias from seed in a single season if a sowing is made early in the year in a warm greenhouse and the plants are grown on without check. The same applies to tuberous Begonias and those of the semperflorens type. Achimenes and Tydæas, too, are other beautiful greenhouse plants which will respond to the same treatment.

Cyclamen persicum from seed needs eighteen months in which to make its growth. The seeds are sown in pans of well-drained soil at the end of July or in August, in a temperature of 50° to 55°, and, as soon as the seeds have germinated, the seedlings are kept as near the glass as possible. When large enough prick them off singly into small pots in which they will pass the winter. In the spring, pot into large pots, and finally into 5-inch or 6-inch pots in which they will flower. They must not, however, receive a check in their growth at any time if they are to make good, sturdy plants, and this, of course, applies to practically everything we raise from seed. Chinese Primulas and other types, like *Primula verticillata*, *P. malacoides*, and *P. floribunda*, are examples of other good greenhouse plants that can be grown from seed to the flowering stage in a single season.

Few amateurs have storage room for Dahlia tubers during the winter time, but, with the marvellous development of the modern Dahlia, seeds can now be obtained which, if sown in heat in February, can be grown into good plants for planting in the open at the end of May. If it is desired to save any special kind the tubers can, of course, be lifted in the autumn and stored in a frost-proof place, then started into growth in a greenhouse in the early spring and cuttings propagated from them. Dahlia cuttings always root best if a small portion of the old tuber is left at the base of the cutting when it is inserted.

Horticulture owes a great debt of gratitude to many amateur owners of greenhouses for their patient labours in the improvement of certain races.

A love for a certain plant or class of plants has been created, and the amateur, either by selection or hybridization of this particular plant or class of plant, has given us many beautiful things. In this way one has only to think of the late Rev. J. JACOB, whose early work on Lachenalias and Freesias opened new avenues for others to follow in, or to pass on to the trade for further development on a large scale.

Without a greenhouse much of this early work would have been impossible, or would have taken a very much longer time to reach fruition, for one of the chief uses of a greenhouse is that seeds can be more easily raised in it, and the seedlings more carefully watched and quickly grown on to the flowering stage. The work of hybridization is also more under control when a greenhouse is available. Moreover, no matter what the outside weather may be, a greenhouse is always accessible, and the amateur who possesses one finds it a great asset to his garden, both for profit and pleasure.

Another much-prized use of a greenhouse is to supply early forced flowers of various kinds before they are available in the open, and there are many plants that can be used for this purpose. Chief among them are the various kinds of bulbous plants, such as Narcissi, Hyacinths, and Tulips. Bulbs which are to be used for this purpose should be well ripened, and are best of a medium size. For early work they must be potted up in late August or September, so as to give them a good time in which to make an abundance of roots. No bulbs respond well to forcing that are not well rooted in their pots before being introduced to heat.

When potting bulbs it is best to keep the crowns of the bulbs slightly above the surface of the soil, and, after potting, to give a good soaking of water to wet the whole of the soil. The pots should then be placed on a bed of ashes in the open and covered to a depth of 5 or 6 inches with a layer of fibre or sifted ashes which have been exposed to the air and rain for some time to get rid of sulphur, which would be liable to cause injury to the young growth of the bulbs.

After seven or eight weeks it will be found that the pots are filled with roots and leaf growth has begun. They may now be removed from the ashes and placed in a frame where they can be gradually inured to the light and their pale yellow growths will have turned green. They can then, as required, be taken into the warmth of a greenhouse and given all the available light, and brought on gradually until the flower-buds are visible, when a little weak liquid manure water will help to develop stronger spikes of flower.

In order to obtain longer flower stalks, tulips are often kept in the dark for a longer period before they are given full light.

With a judicious selection of varieties, it is possible to have Narcissi, Tulips and Hyacinths in flower in the greenhouse from December to May, especially if they be potted up at intermittent periods.

Other valuable winter-flowering bulbous plants are Lachenalias and Freesias, which can also have an extended flowering-period by starting the dormant bulbs at varying successional times from July to December. They should be potted in equal parts sandy loam and

leaf-soil, to which has been added a little well-rotted manure. Both of these are best if started in a cold frame or greenhouse and kept as near to the glass as possible to encourage sturdy growth. They will want very little water until growth has well started, after which they must not be allowed to get too dry, and be given occasional doses of weak liquid manure water to help make sturdy plants. Many people fail with Freesias and Lachenalias because they neglect the plants as soon as they pass out of flower, instead of continuing to give them attention until the foliage shows signs of going to rest. When all the foliage has died down, they should be stored in a dry sunny frame until they are needed for restarting into growth. Both Freesias and Lachenalias need starting in new soil each year, and the latter are good for hanging baskets if so desired.

Nerines, of which there are many fine species and varieties, are other excellent greenhouse bulbous plants. They enjoy much the same sort of soil and treatment as Freesias, except that repotting is only necessary every third year. They must, however, be thoroughly baked in the sun when at rest if they are to grow and flower freely the next season. *Vallota purpurea* and *Veltheimia viridifolia* are two other very beautiful bulbous greenhouse plants easily grown by the amateur. I could give long lists of bulbous and tuberous plants that can be grown in the greenhouse to give a succession of flowers nearly every month in the year, but the amateur must be left to his own choice and suit his own inclinations among the great wealth of material which he has at his command.

Many of you who visit our fortnightly shows will have noticed the use made of the greenhouse for forcing hardy-flowering shrubs such as *Azalea mollis*, Cytisus, *Choisya ternata*, Daphnes, Deutzias, Forsythias, Kalmias, Lilacs, *Magnolia stellata*, *Prunus triloba*, *Pyrus floribunda*, *Ribes sanguineum*, *Spiraea arguta*, *S. media*, *S. Thunbergii*, Wistaria, etc. These plants are potted up early in the autumn as soon as their foliage shows signs of falling, then kept, either plunged in the open or put into a cold house, until required for use. The chief thing to remember with all this class of plant is not to put them into too high a temperature to begin with, but to increase the temperature gradually, otherwise the flower-buds will fall or fail to open. In watering too, always make a point of having the water as warm or warmer than the temperature of the greenhouse, otherwise the plants are apt to get a check.

Climbing plants are often a great attraction in a greenhouse, either for training up pillars or for clothing rafters. For the latter purpose it is best to confine them to vertical wires, not too close together, so that the plants growing below them are not unduly shaded. Fuchsias are splendid for this purpose, especially *Fuchsia corymbosa*, but again the choice of plants for this purpose is so extensive that it must be left to the taste of the individual.

As this lecture is for the amateur I have dealt chiefly with greenhouses known as intermediate, and cool greenhouses, for they cover the

range in temperatures most likely to be needed for any plants that he would grow. The former may be kept at 55° F. night temperature and rise to 65° F. by day during the colder months of the year, and be increased 10° during the spring and summer months. The cool house will scarcely need any artificial heat during the summer months, but in the colder months should have a night temperature of 45° F. and be allowed to rise to 55° during the daytime. If greenhouses of these two types are available it is marvellous what a variety of plants can be grown by the intelligent cultivator.

During recent years there has grown up a big demand for the unheated greenhouse, and how delightful an asset in our fickle climate is an alpine house where the many good things which are now available at small cost can be seen and admired in comfort on a line with the eye, instead of looking at bedraggled specimens in the open, often under uncomfortable weather conditions!

The alpine house at Wisley is certainly the type of house which, on a smaller scale, perhaps, many amateurs might well copy, since it fulfils all the conditions for a house for alpines, being lightly built and well ventilated at all times, which is an absolute necessity for a house of this kind if the plants are to be kept in health.

I am not going to give you a list of plants suitable for growing in such a house, since all of you who have the advantage of visiting the excellent fortnightly shows of this Society can choose for yourselves; but I venture to suggest that, before embarking on the rarer and higher-priced alpines, it would be better to grow some of the cheaper ones first, as these are generally easier to grow, and the amateur could afterwards add to his collection some of the rarer and more difficult plants, when he has learned to understand the chief requirements in the cultivation of alpine plants generally.

Another type of house for the amateur is an unheated house in which to grow ferns, and here I may say that ferns can do with a less intensity of light than many plants, and a north or west wall can well be used against which to build a house for growing them. The chief fern specialists to-day are mostly amateurs who have taken up fern-growing as a hobby, from which they derive a large amount of pleasure.

The late Mr. DRUERY used to have a most interesting fernery attached to his house at Acton, which contained many rare "finds" of fine forms of our British ferns, and it was during some of his fern-hunting expeditions that he discovered the interesting abnormal forms with an unusual type of reproduction, known as apospory and apogamy, which aroused much interest in botanical circles some forty years ago. I only mention this as an example of the great service amateurs, who are keen observers, may render in furthering the progress of horticultural and botanical science.

I feel that I have trespassed at too great a length on your patience, and will end by saying that I have only indicated a few of the many uses to which small greenhouses can be put.

TRIALS OF VARIETIES OF HARDY FRUITS FOR COMMERCIAL PURPOSES.*

AN outline of the scheme for the trial of new varieties of hardy fruits for commercial purposes carried out jointly by the Ministry of Agriculture and the Royal Horticultural Society was given in our JOURNAL, vol. **48**, pp. 65–67.

These trials started in 1922, are now well established, and results of value are emerging.

The scheme has for its main object the trial of new varieties of hardy fruits likely to be of value for commercial growers, and is designed to ascertain the characters which are favourable in a variety and those that are likely to tell against it when grown for the market.

The scheme is administered by a Committee consisting of five representatives of the Ministry of Agriculture, viz. Mr. H. V. TAYLOR (Commissioner for Horticulture); Sir WM. LOBJOIT (Chairman, Fruit and Vegetable Committee, National Farmers' Union); Mr. J. C. F. FRYER (Director, Ministry of Agriculture's Phytopathological Station); Professor B. T. P. BARKER (Director, Long Ashton Fruit Experiment Station); Mr. G. W. LEAK (Manager, Messrs. Bath's Farms, Wisbech); and five representing the Royal Horticultural Society, viz. Mr. E. A. BUNYARD (of the Allington Nurseries, Chairman, R.H.S. Fruit and Vegetable Committee); Mr. C. G. A. NIX (Vice-Chairman of R.H.S. Fruit and Vegetable Committee); Mr. CUTHBERT S. SMITH (fruit-grower, Maidstone); Mr. E. M. BEAR (fruit-grower, Hailsham); and Mr. F. J. CHITTENDEN (Technical Adviser, R.H.S.); under the Chairmanship of Sir DANIEL HALL, F.R.S. (Director, John Innes Horticultural Institution). Mr. A. N. RAWES is now Secretary of the Committee and in charge of all the work connected with these trials.

The cost of working is borne by the two bodies. At the Central Station at Wisley the Royal Horticultural Society provides the land and necessary buildings, maintains a standard collection of varieties for the determination of synonymy and expert supervision of the tests, and the Ministry of Agriculture assists by a grant towards the expenses. The expenditure upon the trials at the Central Station (including the cost of maintaining the Standard Collections) from their initiation to the end of 1931 has been approximately £16,060, towards which the Ministry of Agriculture has made grants amounting to £7,228 18*s.* 3*d.*

METHOD OF THE TRIALS.

Varieties of promise are selected in the first place by the Fruit and Vegetable Committee of the Society from among those exhibited at Vincent Square. The method of selecting varieties for trial may be

* General Report up to December 1931.

gathered from the " points " set out in the scheme appended (p. 272). The owners of the selected varieties are invited to send grafts, cuttings or plants to Wisley, where they are propagated on standard stocks in sufficient quantity to provide uniform material for testing.

The tests are carried out with the following numbers of trees of each variety accepted for trial :

Apples : 20 trees as half-standards on Malling Stock xii ; 10 bushes on Doucin Stock ; 10 bushes on Broad-leaf English Paradise Stock.

Pears : 20 trees as half-standards on selected Pear Stock ; 20 as bushes on Angers Quince Stock.

Plums : 20 trees as half-standards, the stocks used being ' Myrobalan,' ' Mussel,' ' Brompton ' and ' Brussels.' Certain varieties like ' Cambridge Gage ' are grown on their own roots.

Cherries : 10 trees as standards on selected stocks at Borden sub-station ; 5 trees in bush form at Wisley. The stocks used for Cherries are East Malling F 1/12, F 1/5, F 1/9.

Currants : 20 bushes.

Gooseberries : 20 bushes.

Raspberries and Blackberries : 20 plants.

Strawberries : 100 plants.

Nuts : 20 bushes.

The stocks used are propagated for the purpose of the trials in the Nursery at Wisley.

These new varieties are grown alongside well-known commercial varieties, with which their performance is compared, and records of growth, susceptibility to diseases, cropping, and so on are made throughout the whole life.

At intervals throughout the season they are examined by judges (Members of the Committee with Mr. PAGET NORBURY and Mr. A. C. HARRADINE have acted as judges, giving their services gratuitously) appointed by the Committee and the most promising selected for a further test at ten sub-stations established in different parts of England.

The sub-stations are at the Fruit Experiment Station, East Malling, Kent ; the John Innes Horticultural Institution, Merton, Surrey ; the Fruit Experiment Station, Long Ashton, Somerset ; the University Farm, Cambridge ; the demonstration plots of the Norfolk County Council at Emneth ; of the Isle of Ely County Council at Wisbech ; the University of Leeds at Osgodby ; the Durham County Council at Houghall, near Durham ; the Worcestershire County Council at Perdiswell, near Worcester ; and the Cornwall County Council at Elbridge, in the Tamar Valley. A special sub-station for Cherries is to be established at the Farm Institute at Borden, Kent.

The material at each sub-station is in charge of the County or Research Station Officials, and the trials are under the general supervision of the officer in charge of the trials at Wisley and of the Committee. The Committee takes this opportunity of acknowledging the valuable assistance of those in charge of the sub-stations and the great care that officials and recorders have expended upon the trials.

The fruits are grown in these plots in sufficient quantity to give a thorough test of their value in the conditions of cultivation, soil and climate existing in the various localities, records are kept and inspections made by appointed judges, and finally, on the behaviour of the varieties at the Central Station at Wisley and at the sub-stations reports are prepared.

The records made at the Central Station and at the sub-stations are on as uniform a basis as possible, so that comparisons may be easily made, and as all material is propagated for distribution to the sub-stations from the plants under trial at Wisley, the material being tested is as uniform as possible; while allowing for some local variations in practice the planting distances, pruning, and cultivation are uniform in the different districts.

The trials are open for inspection by arrangement at all the stations mentioned as well as at Wisley, and for permission to see them application should be made in each instance to the officer in charge.

This is the first of the reports giving broad details of the behaviour and characteristics of varieties that have been under trial sufficiently long to warrant a report being made.

The notes and recommendations that follow are based upon the records made at the Central Station and the sub-stations by those in charge, and on the opinions they have formed, and upon the observations of the Judges on their periodical visits to the plots.

Further details of the trials are given under the different fruits.

The Central Station, Wisley, Surrey.

In addition to the fourteen acres occupied by the standard collections of the different fruits grown for comparison of varietal characters in the gardens at Wisley, just over twenty-two acres are occupied with the actual trials.

The older part of the Standard Collection is on the hill at Wisley above the rock garden, the newer immediately adjacent to the trial blocks of trees in Deers and Millands Fields. All the older varieties are being established near the trials so as to make comparisons easier.

The numbers of varieties or supposed varieties represented in the Standard Collection are approximately—

Apples	600	varieties
Pears	140	,,
Plums	100	,,
Cherries	20	,,
Black Currants	70	,,
Red and White Currants	40	,,
Gooseberries	113	,,
Raspberries	90	,,
Strawberries	60	,,
Blackberries, etc.	18	,,
Nuts	57	,,

The Nursery for the propagation of trees and plants for both Central and sub-stations occupies 2 acres north of the Director's House on the Byfleet Road.

The Plantations are on the farm land east of the Byfleet Road and comprise :

Deers Field, chiefly of Apples, interplanted with Raspberries, Black and Red Currants, Gooseberries and Strawberries—11 acres.

Millands Field, chiefly of Apples, Pears, Plums, Nuts and Cherries—9 acres.

There are (or have been) now under trial at Wisley of—

Apples . . .	110 varieties
Pears	9 ,,
Plums and Damsons .	22 ,,
Cherries . . .	9 ,,
Red Currants . .	21 ,,
Gooseberries . .	18 ,,
Raspberries . .	51 ,,
Strawberries . .	27 ,,
Black Currants . .	50 ,,
Other berries . .	11 ,,
Nut	1 variety

Of these varieties fifty-seven have been selected because of their promise for distribution to the sub-stations, viz. seven Apples, three Plums, two Strawberries, twenty Black and five Red Currants, six Gooseberries, and fourteen Raspberries. Many of these are already established as fruiting trees at the sub-stations (see below), others are being propagated for the purpose.

In addition to the seven varieties of Apple selected, several seedling Apples raised in Canada have also been distributed in small numbers for preliminary trial.

The general characters which judges take as necessary in a recommendable variety may be summarized thus :

The variety should be an improvement upon existing commercial varieties in one or more important characters.

The season should not clash with existing varieties unless the variety under consideration is decidedly superior and likely to replace the older varieties. It should closely follow or precede an existing variety or extend the season of a particular kind of fruit.

The trees or bushes or plants must be healthy and easily kept free from insect and fungus attack.

The variety should not be liable to frost injury in spring.

Fruit must be of good appearance, quality, and commercial size.

Growth must be reasonably vigorous and of good habit.

Fruit must be capable of withstanding conditions of transport without damage.

Black Currants.

At the outset of the trial four well-known varieties were selected as standards, against the behaviour of which in the different stations the new varieties can be compared. These varieties represented the four groups of Black Currants then recognized. They were 'Boskoop Giant,' 'Baldwin,' 'Seabrook's Black,' and 'Goliath.' These were propagated from true stocks of the varieties, and at least twenty bushes of each are planted at each sub-station as well as at the Central Station.

Of the other varieties under trial at Wisley 'Blacksmith,' 'Davison's Eight,' 'Daniels' September,' 'Westwick A,' and 'Taylor's' were distributed to the sub-stations in 1925–6 as their performance at Wisley suggested the possibility of useful commercial qualities. 'Westwick C' and 'Mite Free' were similarly distributed in 1926–7, 'Supreme,' 'Matchless,' 'Invincible Giant Prolific,' 'Wallace Seedling,' and 'Nigger' in 1927–8, 'Climax' in 1929–30, and 'Raven' in 1930–1, while 'Wellington Triple X' and 'Black Tony' were distributed for planting in 1931–2.

Some of these varieties have therefore not been long enough at the sub-stations for the judges or those in charge to form a definite opinion upon them, but the following notes will show the main characteristics of those varieties which have been longest under trial.

Standard Varieties.

A brief account of the manner in which the four standard varieties behave and their performance at the different stations will assist comparison with the newer varieties.

Boskoop Giant (fig. 77) has made very large, sparsely branched, spreading bushes, but lower branches are mostly held well clear of the ground and fruit is rarely spoiled by splashing or contact with the ground. Flowers open early, and it is the earliest of all varieties to ripen fruit. Bunches are long—the longest of any, usually borne singly with from eight to ten large, sweet, soft-fleshed and thin-skinned berries in a bunch. The berries ripen evenly, but do not hang well when ripe, nor do they travel well, being easily squashed unless picked before thoroughly ripe.

"Running Off" is a fault in some seasons, and cropping has been very irregular at some stations. This variety has behaved least satisfactorily at East Malling and Durham, while at Osgodby, Merton, Long Ashton, and at Wisley cropping has been consistently heavy.

Records show that this variety is not more susceptible than most other well-known varieties to Big Bud and Reversion, and while the poor "carrying" quality of ripe fruit places a decided limit upon its commercial usefulness, the early ripening and good quality of the fruit make it a variety which cannot yet be dispensed with.

Baldwin.—The stock of 'Baldwin' grown in the trials is the East Malling 'Baldwin' as distinct from the 'Hill Top Baldwin.' Both

stocks of the variety are growing at Wisley, and the greater vigour of bushes of the ' Hill Top Baldwin ' appears the only noticeable difference between them.

On the trial plots ' Baldwin ' has made rather dwarf, upright, compact bushes, though at Wisley and at Osgodby the bushes have grown to considerable size. ' Baldwin ' is the first of all varieties to come into flower and among the latest to mature fruit. Bunches are of medium length, often in pairs on the spurs, with six to nine large, or fairly large, tough-skinned, acid berries in a bunch.

Cropping has been consistently good at some stations : irregular and unsatisfactory at others. At East Malling and Osgodby excellent crops have been recorded almost every year, and at the first-named station it ranks second to none in productiveness. At Wisley ' Baldwin ' has behaved much less satisfactorily. Bushes have grown remarkably well and have blossomed profusely each spring, yet the variety has not cropped nearly as well as the other standard varieties of the same age. At other stations, cropping has been fairly satisfactory in most years, but on the whole the variety has hardly upheld its reputation of great fertility.

Seabrook's Black represents the French Group of varieties, and at all stations this has made large, spreading bushes, very little smaller, but less spreading than those of ' Boskoop Giant.' Flowers open later and the fruit is a few days later in ripening than ' Boskoop Giant.' Bunches are long and well filled with large, tough-skinned and acid berries, which ripen evenly. The fruit " carries " particularly well, even when quite ripe.

This variety has cropped heavily and regularly at all stations, being particularly good at Wisley, Osgodby and Worcester. " Running Off " has been observed in most years, but despite loss of fruit from this cause the variety ranks high in cropping capacity. While Big Bud Mite and Reversion have occasioned some losses at all stations, failures from these causes have been fewer than with other standard varieties.

Goliath, representing the ' Victoria ' Group (fig. 78), has made large, erect, compact bushes, which in point of vigour and habit exemplify the type of bush well suited for commercial planting. ' Goliath ' comes into flower a little later than ' Boskoop Giant ' and the fruit ripens a little later than ' Seabrook's Black.' Bunches are very short, with three or more crowded together on a spur. Berries are large, sweet, with rather tender skins. The short, crowded bunches are difficult to pick, and this character, with the tender skin, detracts from the commercial value of the variety.

' Goliath ' has cropped very heavily and regularly at all stations, and over a number of years has proved one of the heaviest croppers at Wisley. It has behaved least satisfactorily at East Malling. Few instances of " Running Off " have been recorded, and on the whole the variety has proved no more susceptible to Big Bud Mite and Reversion than has ' Boskoop Giant ' or ' Baldwin.'

Newer Varieties.

Blacksmith (Laxton) has made very large and markedly spreading bushes. Much fruit is spoiled by branches bearing down to the ground, even when no great weight of fruit is carried. The time of flowering coincides roughly with that of ' Seabrook's Black,' and the fruit ripens with that of ' Goliath,' sometimes a little earlier. Bunches are long and berries are large—often very large, sub-acid, with a rather tough skin. Cropping has been irregular, but very heavy crops have been carried in some seasons at most stations, particularly at Osgodby, Merton, and Worcester.

Great difficulty has been experienced at all stations in rogueing the bushes of this variety for Reversion. The foliage and growth commonly shows symptoms associated with Reversion—in small, pointed leaves, abnormal veining and much " feathering " of young growths along the branches, but bushes showing these symptoms are not necessarily unfruitful—they do on occasion fruit heavily. Numbers of bushes have, however, become entirely unfruitful. It is doubtful if a stock free from the peculiarities indicated exists, and for this reason and the drooping, loose habit of growth, the variety appears of little commercial value and is no longer under trial.

Daniels' September (Daniels) has made large bushes, which in habit resemble ' Baldwin,' but growth is more vigorous. It is one of the earliest varieties to come into flower, being but a day or two later than ' Baldwin,' and is the latest to ripen its fruit. At most stations the crop is ready for picking a week or ten days later than ' Baldwin,' although the berries would probably hang later in favourable seasons. The latest picking date of saleable berries recorded at the stations over a period of years is August 21, in 1929, at Osgodby, but berries have been left to hang (protected from birds) until the end of August and into September at Wisley. Bunches are of medium length, often in pairs, and usually with six to eight medium to large, acid and tough-skinned berries in a bunch. Cropping has been somewhat irregular and least satisfactory at Wisley (where ' Baldwin ' also is mostly a failure), but in favourable seasons very heavy crops have been carried by the bushes on most plots. This, so far, has proved the best late Currant in the trials and a variety which might be widely planted in those districts where late-ripening Currants are profitable. Results so far obtained point to the fact that in places where ' Baldwin ' succeeds, there ' Daniels' September ' may be expected to do well, and vice versa.

Westwick A (Col. Petre) has made moderate-sized bushes of rather spreading habit. The flowers open at about the same time as ' Seabrook's Black,' but fruit ripens a little later than this variety, coming generally between ' Seabrook's Black ' and ' Goliath.' Bunches are fairly long and well filled with medium to small, sub-acid and tough-skinned berries, which hang well when ripe and travel well. Bushes have cropped satisfactorily at most stations, but the variety has



FIG 77.—BLACK CURRANT 'BOSKOOP GIANT

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Fig 78.—Black Currant 'Victoria

shown no characters of outstanding merit and so is removed from the trials.

Davison's Eight (Col. Petre) has made medium to large, sturdy, semi-upright bushes. Flowers open early, a little later than ' Baldwin,' and in most seasons the fruit is ready to pick a little before ' Seabrook's Black.' The bunches are of medium length, borne in pairs or threes, and are easy to pick, with usually some six to eight large berries in a bunch. The berries are a little tough-skinned and travel well when ripe. Cropping has been irregular: good in most years at Worcester, Osgodby, Merton, and East Malling, less satisfactory at the other stations. The variety appears rather more liable to scorch by lime-sulphur spraying in spring than are most other varieties. At stations where cropping has been satisfactory this appears to be a promising variety, but markedly more suitable to certain districts than to others, and further trial is necessary before any definite recommendation can be made (fig. 79).

Taylor's (Taylor).—This variety makes a medium-sized, erect, compact bush. It is the latest of all varieties to come into flower and leaf and the fruit ripens a little later than ' Baldwin,' but does not hang so late as ' Daniels' September.' Bunches are short and berries are small, and on the whole crops have been light at all stations. When distributed it was thought this might prove a useful late variety—the very late flowering being a valuable character; but its performance has not justified continued trial and the variety is now discarded.

Mite Free (Laxton) has made large, spreading bushes. Flowers open with those of ' Seabrook's Black '; the fruit ripens about the same time as that of ' Goliath ' or a little later. Bunches are of medium length, well filled with medium to large, sub-acid and rather tough-skinned berries, which hang well when ripe. Cropping has been irregular at all stations, though heavy crops have been carried in some years at most places. The variety has not proved more resistant to the Big Bud Mite than have the several varieties which fall into the French Group, and since it exhibits no characters of commercial importance that mark it as an improvement upon existing varieties of similar type, it has been removed from the trials.

Westwick C (Petre) has made very large, spreading bushes, and in most years much of the fruit is spoiled by branches dragging upon the ground. Flowers open rather early, soon after ' Baldwin,' and the fruit is ripe with that of ' Seabrook's Black ' or a little later. Bunches are of medium length, well filled with large, sweet berries. The fruit is rather tough-skinned and travels well, and this is perhaps the best flavoured Currant in the trials. Heavy crops have been carried by this variety, and it has been consistently good at most stations. The habit of the bush detracts from the value of the variety for commercial planting, but further trial seems desirable.

Supreme (Jones).—This has made medium to large, compact and erect-growing bushes, combining characters of ' Goliath ' and

'Baldwin.' Flowers open early, a little later than 'Baldwin,' and the fruit ripens late. In some years it can be picked at about the same time as 'Baldwin,' but it is often a few days earlier. The bunches are long and berries are large, tough-skinned and somewhat acid; the bunches are usually in pairs on the spurs. At Wisley the variety has cropped very heavily and regularly, but it has not been long enough at other stations to permit any recommendation.

Matchless (Jones) makes a large, compact and vigorous bush. Flowers open rather early and the fruit ripens a little later than 'Seabrook's Black.' Bunches are of medium length and well filled with large, sub-acid berries which are a little thin-skinned. 'Matchless' has cropped heavily at Wisley and satisfactorily on the younger bushes growing at other stations, behaving particularly well at East Malling, Merton, Osgodby and Wisbech. Further test is necessary before the early promise can be confirmed.

Invincible Giant Prolific (Storrie).—This has made large, sturdy, compact and erect bushes which in most characters closely resemble 'Goliath.' Flowering and fruit-ripening times coincide with those of 'Goliath,' but bunches are a little longer and the berries a little tougher in the skin and not so crowded in the bunches. Picking is easier than with the 'Goliath' crop and the berries "carry" better. Further trial may show that these characters make it an improvement upon the old variety (fig. 80).

Nigger (Beckett) also makes large, compact, sturdy bushes which closely resemble those of 'Goliath.' Flowering and ripening times are the same as 'Goliath,' and further trial is necessary to determine whether it possesses characters which will mark it as an improved form of this group (fig. 81).

Wallace Seedling (Wallace) has made moderately large, compact bushes of 'Baldwin' group. Flowers open a little later than those of 'Baldwin' and the fruit ripens late, being ready to pick about the same time as 'Baldwin.' Bunches are fairly long and berries are of medium size, tough-skinned and sub-acid. This has cropped heavily at Worcester, Merton, Emneth, Osgodby, and Wisley, satisfactorily at all stations, and is regarded as a promising variety worthy of extended trial.

The following notes upon varieties recently distributed, or about to be distributed, to the stations are, of course, based upon observations made at the Central Station only:

Climax (Saunders) is a Canadian variety of vigorous growth, making large, compact bushes. Bunches are of moderate length and the berries, which are of medium size, very thick-skinned and acid, colour early and hang well.

Raven (Laxton) makes a large, spreading bush. Fruit ripens a few days later than 'Boskoop Giant' and before 'Seabrook's Black,' the bunches being long and the berries larger, rather thin-skinned and sweet.

Black Tony (Kloosterhuis) is a markedly vigorous variety, making

bushes larger than those of ' Boskoop Giant ' of the same age. Fruit ripens later than ' Seabrook's Black ' and bunches are of medium size, filled with tough-skinned, acid berries of medium size (fig. 82).

Wellington Triple X (East Malling) makes a vigorous spreading bush, the lower branches often bearing down near to the ground. Fruit is ready to pick a little later than ' Boskoop Giant,' and bunches are markedly long. Berries are large, sweet, and with a tough skin. If further trial proves the habit of growth suitable for commercial planting, this should become a valuable variety.

Average time of ripening at all Sub-Stations and Wisley.

' Boskoop Giant ' is the earliest Black Currant to ripen, and is followed by ' Wellington Triple X,' ' Raven,' and ' Davison's Eight,' which it is generally possible to harvest a few days before ' Seabrook's Black.' ' Westwick A,' ' Westwick C ' and ' Blacksmith ' follow closely after ' Seabrook's Black,' with ' Goliath,' ' Nigger,' ' Invincible Giant Prolific ' and ' Matchless ' next. A few days later ' Mite Free ' and ' Black Tony ' are ripe, followed by ' Climax.' The ' Wallace Seedling ' and ' Supreme ' are next, closely followed by ' Baldwin.' ' Taylor's ' is usually a few days later, and ' Daniels' September ' the latest of all.

Summary

So far the tests have demonstrated that the position held by the four standard varieties, ' Baldwin,' ' Boskoop Giant,' ' Seabrook's Black,' and ' Goliath,' is not immediately challenged.

' Daniels' September ' is quite the best late-ripening currant, but ' Supreme ' and ' Wallace Seedling ' both promise well, and in some districts may come to rival the position of ' Baldwin ' as a commercial variety to follow ' Goliath ' or ' Victoria.' Of the ' Goliath ' group, ' Invincible Giant Prolific ' may prove to be better than the older variety. ' Davison's Eight ' is more suitable for growing in some districts than in others, and further trial may prove it a valuable variety for those particular districts in which it is known to succeed. None rivals the position of ' Boskoop Giant ' as a first-early variety, although ' Wellington Triple X ' and ' Sunrise,' a new variety not yet planted at the sub-stations, may prove more suitable for commercial planting than ' Boskoop Giant.'

* * * * * *

Among the many new varieties of Black Currants undergoing preliminary trial at Wisley, but which have not been established long enough to enable the judges to form definite opinion of their qualities, are several seedlings raised at the Long Ashton Research Station. Many of these show distinct promise. There are also varieties that have been established in the trial grounds for several years, but which have, up to the present, failed for one reason or another to

CROPPING OF BLACK CURRANTS AT WISLEY

	Planted.	1925.		1926.		1927.		1928.		1929.		1930.		1931.	
		Per Bush.	Per Acre.	Per Bush.	Per Acre.	Per Bush.	Per Acre.	Per Bush.	Per Acre.	Per Bush.	Per Acre.	Per Bush.	Per Acre.	Per Bush.	Per Acre.
		Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs	Tons.	Lbs	Tons	Lbs.	Tons.	Lbs.	Tons.
Baldwin	1923	1·7	·9	·5	·2	3·7	2·0	·8	·4	·5	·3	1·0	·5	4·0	2·1
Boskoop Giant	,,	·9	·5	·7	·4	4·8	2·6	1·4	·75	2·9	1·6	4·5	2·4	6·8	3·6
Climax	,,	·3	·2	1·5	·75	·9	·5	1·2	·6	3·4	1·8	7·4	4·0	*	
Daniels' September	,,	1·0	·5	·5	·3	3·9	2·1	3·2	1·7	1·7	·9	5·0	2·7	1·8	1·0
Davison's Eight	,,	·8	·4	·9	·5	1·7	·9	·9	·5	1·4	·75	1·7	·9	5·3	2·8
Goliath	,,	2·1	1·2	3·4	1·8	4·3	2·3	4·2	2·2	7·1	3·8	8·4	4·5	4·5	2·4
Seabrook's Black	,,	·5	·3	2·7	1·4	6·2	3·3	2·0	1·1	6·3	3·4	5·9	3·2	5·0	2·7
Taylor's	,,	·6	·3	2·4	1·3	3·6	1·9	·9	·5	2·5	1·3	3·2	1·7	3·3	1·8
Westwick A.	,,	1·6	·3	1·1	·6	2·9	1·6	1·3	·7	4·4	2·3	3·3	1·8	6·5	3·5
Westwick C.	,,	·8	·4	2·4	1·3	3·6	1·9	·6	·3	4·6	2·5	7·8	4·2	5·6	3·5
Mite Free	1924			1·9	1·0	4·2	2·2	8·9	4·8	3·2	1·7	5·5	2·9	4·2	2·2
Black Tony	1926					·5	·3	*		2·4	1·3	7·3	3·9	9·6	5·1
Invincible Giant Prolific	,,					1·9	1·0	2·3	1·2	3·6	1·9	12·3	6·7	5·9	3·2
Matchless	,,					·6	·3	·9	·5	1·9	1·1	4·4	2·4	5·9	3·2
Nigger	,,					·7	·4	2·4	1·3	3·0	1·6	6·5	3·5	7·7	4·1
Supreme	,,					*		·9	·5	2·1	1·0	9·9	5·3	4·3	2·3
Wallace Seedling	,,					1·4	·7	·4	·2	·5	·3	4·5	2·4	3·6	1·9
Raven	1928									·5	·3	1·5	·8	7·8	4·2
Wellington Triple X	1929													4·4	2·4

* Not weighed.

N.B.—In all Tables the Black Currant weights per acre have been calculated on the assumption of 1200 bushes to the acre. Weights are given from only a few of the sub-stations.

Cropping of Black Currants at Merton.*

	Planted.	1927.		1928		1929		1930.		1931.	
		Per Bush	Per Acre	Per Bush.	Per Acre.	Per Bush	Per Acre	Per Bush	Per Acre.	Per Bush.	Per Acre.
		Lbs	Tons	Lbs	Tons	Lbs	Tons	Lbs	Tons	Lbs	Tons
Baldwin	1925–6	·5	·3	1·5	·8	4·8	2·6	5·5	3·0	7·0	3·8
Blacksmith	,,	·8	·5	4·3	2·3	7·2	3·8	8·8	4·7	9·8	5·2
Boskoop Giant	,,	·4	·2	2·8	1·5	8·4	4·5	9·8	5·2	12·9	6·9
Daniels' September	,,	·6	·3	2·0	1·1	6·0	3·2	6·8	3·7	9·5	5·1
Davison's Eight	,,	·4	·2	1·2	·7	5·6	3·0	6·2	3·3	6·7	3·6
Goliath	,,	·5	·3	5·2	2·8	8·5	4·6	5·1	2·7	12·4	6·7
Seabrook's Black	,,	·5	·3	3·5	1·9	6·6	3·6	7·9	4·2	9·5	5·1
Taylor's	,,	·1	—	1·1	·6	3·9	2·1	3·0	1·6	3·5	1·9
Westwick A.	,,	·5	·3	1·8	1·0	4·8	2·6	5·4	2·9	7·5	4·0
Mite Free	1926–7			1 8	1·0	3·2	1 7	5·7	3·0	2·9	1·5
Westwick C.	,,			1·1	·6	5·1	2·7	7·7	4·1	6·8	3·6
Invincible Giant Prolific	1927–8					1·3	·7	3·5	1·9	6·7	3·6
Matchless	,,					·8	·5	2·7	1·4	7·1	3·8
Nigger	,,					·9	·5	3·1	1·7	5·0	2·7
Supreme	,,					1·0	·6	3·8	2·1	9·7	5·2
Wallace Seedling	,,					1·4	·8	3·2	1·7	6·2	3·3
Climax	1929									3·4	1·8

* The trial ground at Merton is protected by walls.

satisfy the judges that they possess the qualities desirable for commercial growing. Among those passed over by the judges are 'Hatton

CROPPING OF BLACK CURRANTS AT PERDISWELL.

	Planted.	1929.		1930.		1931.	
		Per Bush.	Per Acre.	Per Bush.	Per Acre.	Per Bush.	Per Acre.
		Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.
Baldwin	1926	4·1	2·2	6·3	3·4	3·5	1·9
Blacksmith	,,	6·9	3·7	5·2	2·8	2·2	1·2
Boskoop Giant	,,	3·6	1·9	5·1	2·7	3·5	1·9
Daniels' September	,,	4·6	2·5	6·1	3·3	3·8	2·0
Davison's Eight	,,	5·0	2·7	5·7	3·1	3·3	1·8
Goliath	,,	5·4	2·9	7·2	3·9	4·2	2·2
Seabrook's Black	,,	4·0	2·2	4·0	2·2	3·1	1·7
Taylor's	,,	3·4	1·8	2·1	1·1	2·2	1·2
Westwick A.	,,	3·2	1·7	3·7	2·0	2·5	1·3
Mite Free	1927	4·8	2·6	3·1	1·7	2·0	1·1
Westwick C.	,,	5·5	2·9	4·0	2·2	2·9	1·6

CROPPING OF BLACK CURRANTS AT OSGODBY.

	Planted.	1928.		1929.		1930.		1931.	
		Per Bush.	Per Acre.	Per Bush.	Per Acre.	Per Bush.	Per Acre.	Per Bush.	Per Acre.
		Lbs	Tons	Lbs.	Tons	Lbs.	Tons.	Lbs.	Tons.
Baldwin	1926	3·1	1·7	5·1	2·7	10·7	5·7	6·5	3·5
Blacksmith	,,	3·6	1·9	6·7	3·6	8·6	4·6	*	
Boskoop Giant	,,	1·7	·9	4·1	2·2	7·1	3·8	4·7	2·5
Daniels' September	,,	4·3	2·3	6·6	3·5	7·9	4·2	3·6	1·9
Davison's Eight	,,	3·4	1·8	4·9	2·6	7·8	4·2	4·9	2·6
Goliath	,,	4·1	2·2	5·9	3·2	5·8	3·1	5·4	2·9
Seabrook's Black	,,	1·9	1·0	7·9	4·2	5·5	2·9	4·7	2·5
Taylor's	,,	1·0	·5	1·9	1·0	*		*	
Westwick A.	,,	2·6	1·4	4·7	2·5	5·5	2·9	*	
Mite Free	1927			3·2	1·7	6·8	3·6	*	
Westwick C.	,,			3·9	2·1	7·8	4·2	4·5	2·4
Invincible Giant Prolific	1928					2·9	1·5	4·5	2·4
Nigger	,,					2·6	1·4	5·2	2·8
Matchless	,,					1·9	1·0	3·7	2·0
Supreme	,,					1·7	·9	3·5	1·9
Wallace Seedling	,,					3·0	1·6	5·2	2·8
Climax	1930							1·4	·8

* Not weighed.

Black,' 'Hatton Giant,' 'Trinder's Long Bunch,' 'Orr's Seedling,' 'Reliance,' 'Perfection,' 'Florence,' 'Trail's Perfection,' 'Coulter Mains,' and three Canadian varieties, 'Eagle,' 'Ontario,' and 'Kerry.'

Of the continental varieties growing at Wisley a few have proved to be synonymous with varieties grown in this country; others have shown no improvement upon the best varieties now widely planted.

RASPBERRIES.

Of Raspberries three well-known varieties were selected as standards with which to compare the newer varieties under trial, these being 'Lloyd George,' 'Baumforth's Seedling A,' and 'Baumforth's Seedling B.' A 40-foot row of each, propagated from selected stocks of the variety, is planted at each station.

Fourteen varieties have been selected from the large number growing in the trials at Wisley for distribution to the sub-stations.

Those already planted at the sub-stations, in addition to the three standard varieties, are 'Pyne's Royal,' 'Red Cross,' 'Devon,' and 'Bountiful,' distributed in 1925–6; 'Brockett Hall' and 'Lynn's Superb,' distributed in 1927–8; 'Rival,' 'Reward,' and 'Epicure,' in 1928–9; 'Matchless,' in 1929–30; and 'Norfolk Giant,' distributed in 1930–1; 'Duke of Cornwall' and 'Merton 1/20 B' were distributed in 1931–32.

As with the Black Currants, some of the varieties have not yet been long enough at the sub-stations to enable their commercial values to be judged, and whilst definite opinion has been formed regarding the suitability for commercial planting of the earliest distributed, others need further trial.

At most stations the canes are grown without permanent support, but temporary support for fruiting canes is provided in summer as occasion demands.

Early ripening being an important commercial character, it may be mentioned here that none of the varieties ripens its fruit outstandingly early. On the date when picking commences at Wisley it is usually possible to gather from 'Lloyd George,' 'Red Cross,' 'Pyne's Royal,' 'Baumforth's Seedling B,' and 'Brockett Hall,' but in every season 'Lloyd George' has provided the heaviest weight of fruit at the first picking of Raspberries, with 'Red Cross' next. 'Norfolk Giant' is one of the latest to ripen at Wisley. For some years 'Devon' held this place, but 'Norfolk Giant' has proved as late, even a little later, and is a far healthier grower than 'Devon.' 'Lloyd George' and 'Bountiful' also provide good late berries. Records show that much the same order of ripening is general at the sub-stations.

The following notes give the main characteristics of the varieties growing at the stations.

Lloyd George.—This variety is exceptionally vigorous, making stout, erect canes up to 6 feet high. The young canes, which are produced in very great quantity, are densely pubescent, with numerous, conspicuous, dark spines. Leaves are large, rugose, and held nearly flat. The fruit is large and very long, rounded at the end and fairly bright in colour, turning rather dull when fully ripe. The berries are easily "plugged," are firm, and travel well. The picking season extends over a long period, the first-ripening berries being ready for gathering as early as those of any variety—earlier than most. This is claimed to be a perpetual fruiting variety, but in the trials the young

canes have provided insufficient late fruit to make the perpetual fruiting habit a commercial consideration. At all stations this variety has cropped remarkably heavily, and for the first few years after planting carried a greater weight of fruit than any other variety planted at the same time. Records show there has been considerable falling-off in cropping and vigour during the last few years at all stations, however; this being most marked at Merton, Wisbech, and Worcester. There is some disease in the stock, but how far this may account for the weakening is as yet uncertain. It is worthy of note that at Wisley, where fresh plantings are made at intervals for comparison with newer varieties, 'Lloyd George' canes propagated from the original stock remain vigorous and extremely productive, although the rows established four or more years show marked deterioration.

Baumforth's Seedling A is the variety thought to be the original 'Baumforth's Seedling.' Growth is vigorous, canes being very stout, erect, and usually from 5 to 6 feet high. The new canes are glabrous, with numerous inconspicuous spines, and are produced in considerable quantity, making a crowded row. The leaves are large, finely rugose, and held nearly flat. This may be classed as a mid-season variety, berries being large, sometimes very large, round, well coloured, juicy and slightly acid. The fruit is easily "plugged" but very soft, crumbles when picked, and does not travel well. Very heavy crops have been carried by the variety, but disease is general in the stock, and at some stations cropping has been considerably reduced. The fruit is too soft for commercial purposes and the variety is now eliminated from the trials.

Baumforth's Seedling B.—This is the variety most commonly grown as 'Baumforth's Seedling.' Growth is moderately strong, canes being some 5 feet in height. New canes, which are produced in great profusion, are somewhat spindly and spreading, with numerous small but conspicuous dark spines. The leaves are of medium size, finely rugose, generally a little curled under, and dull green in colour. The fruit is ready to pick early and berries ripen successionally over a long period. Berries are rather small, markedly conical, dark red and sweet: they are firm and travel well, but are a little difficult to pick. Satisfactory crops have been carried at some stations, but generally cropping has been light, and since the small, dull-coloured berries do not provide a good market sample the variety has not proved a worthy "standard" with which to compare newer varieties and it is now discarded.

Pyne's Royal (Pyne).—This variety has made stout canes at most stations, but under some conditions, notably at Ellbridge and Merton, it has made very little new cane each year. It is characteristic of the variety to make new cane growth rather sparsely, particularly during the first season or two after planting: afterwards, with generous treatment, cane growth is usually sufficient to make full rows. At Wisley, Worcester, Osgodby, Wisbech, and Emneth new cane has been produced in plenty each year, the average height being 4 to 5 feet; at other stations the average height rarely exceeds 3½ feet. The young



Fig. 79. Black Currant. Davison's Eight.
(p. 255)

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Fig. 80. Black Cultani. Invincible Giant Frontignac (p. 254)



Fig. 81. Black Currant 'Nigger' (p. 254).



Fig. 82. Black Currant 'Black Tony'
(p. 254)

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canes are stout and stiff, erect-growing, and reddish-purple in colour, with a few conspicuous dark spines scattered here and there. Leaves are large, very much curled and usually are twisted sideways. Fruit ripens early and there is good succession. Berries are very large, conical, firm, deep red, and well flavoured, making excellent dessert fruit. The fruit is easily "plugged" and travels well. There is comparatively little disease in the stocks under trial, and this is regarded as a valuable variety deserving recommendation.

Red Cross (Pyne).—This variety grows vigorously, making stout canes up to 5 feet high. The new canes, which are numerous, are erect early in the season, but bend over later, and for best results bearing canes should be supported. The new canes are distinguished by their light green colour and inconspicuous pale spines. Leaves are large, rugose, and flattish, becoming a little curled under toward the end of the summer. Fruit ripens early—as early as any variety—and berries ripen successionally over a long period. Berries are large, of uniformly good size, conical or rounded, and a bright colour, turning dull red when fully ripe. The fruit is of good quality, "plugs" easily, and, although rather soft, travels satisfactorily. The variety is slower in reaching its heaviest yield than are some varieties, but it has grown well and cropped very heavily at all stations and is regarded as the most promising of the newer varieties growing at the stations and one worthy of recommendation.

Bountiful (Laxton).—This variety grows vigorously, making semi-erect canes up to 6 feet high, new canes being produced in great quantity. Leaves are large and held flat. The fruit ripens in mid-season and berries ripen successionally until late. Berries are medium to large, conical, and sweet, a bright red early, turning rather dull when fully ripe; they are a little soft and do not "plug" easily. This variety has carried very heavy crops at most stations, but is regarded as of small commercial value—largely owing to difficulty in picking the fruit—and it is now eliminated from the trials.

Devon (Pyne).—This has grown strongly and made fairly stout, semi-erect canes up to 5 feet in height. New canes are numerous; glabrous, with numerous stiff, inconspicuous spines. Leaves are large, coarsely rugose and generally are much curled under. The fruit ripens late, this being one of the latest ripening varieties grown at the stations. Berries are large, conical or round, fairly firm and well flavoured, but are a little difficult to pick, being apt to crumble. At most stations this variety has cropped heavily, but during the last few years there has been marked falling-off in cropping, much of the fruit failing to finish well. This failing is largely due to disease characterized by yellowing of the foliage, which is severe in this variety at all stations, and endeavours to obtain a healthy stock of the variety having so far failed, it is now eliminated from the trials.

Brockett Hall (Pateman).—The stock as received for trial and as growing at the stations consists of two varieties mixed. The two vary somewhat in habit and foliage but are similar in fruit, the berries of

both being large, long, conical, firm, and of good colour and quality. This stock has grown very vigorously and cropped remarkably heavily at Wisley, the fruit ripening early and extending over a long season. The two selected stocks will be planted and tested separately.

Epicure (Harraway).—This variety has grown strongly, making very stout, semi-erect canes about 5 feet high. The new canes, which are moderately numerous, are reddish-purple, glabrous, with stiff, inconspicuous spines. Leaves are very large, coarsely rugose, deep green, and much curled under, the foliage somewhat resembling that of 'North Ward.' Fruit ripens fairly early—not so early as that of 'Lloyd George' and 'Red Cross'—and continues over a comparatively short season. Berries are large, conical or round, bright red, sweet, and a little soft. The fruit is not as easily "plugged" as that of some varieties. This Raspberry has cropped heavily at Wisley. It is satisfactory at those stations where it has become sufficiently established, but further trial is necessary to determine its commercial possibilities.

Lynn's Superb (Lynn).—This variety has grown moderately vigorously, making stout, erect canes from 4 to 5 feet high. At Worcester, Merton, Osgodby and Wisley growth is satisfactory, but at other stations is not sufficiently robust. The variety is not planted at Emneth and Wisbech, as it was reported unsuitable for these districts. New canes are fairly numerous, with large, rugose leaves which are a little curled under. Fruit ripens early—as early as that of any variety. Berries are large, conical or rounded and of a particularly attractive, bright red colour, not turning dark when berries are fully ripe; juicy and sweet, but soft, crumbling when picked, and "carrying" badly. This variety has cropped heavily at Wisley (where it is regarded as a commendable garden variety), but it appears of small commercial value and is eliminated from the trials.

Reward (Laxton).—This has grown well at Wisley and has carried good crops of excellent fruit. The fruit ripens early and "plugs" easily, berries being of medium size, bluntly-conical, moderately firm, well coloured, and of good dessert quality. Further trial is necessary.

Rival (Laxton) is moderately vigorous, making long, stout canes which bear large, conical, firm berries of good quality. The fruit ripens in mid-season and continues until late. Further trial is necessary.

Matchless (Morgan) is an early-ripening variety of good vigour: berries being large, conical, well coloured and of good quality.

Norfolk Giant (introduced by GOUDE) is a late-ripening variety of great vigour, and so far as can be judged from its performance at Wisley—where it has in some seasons carried the heaviest crops of any variety—it should prove worthy to take the place of 'Devon.'

Among the many varieties that have been established in the trial grounds at Wisley for some years, and which so far have not satisfied the judges that they possess sufficient commercial merit to warrant extended trial at the sub-stations, are 'Hornet,' 'Norwich Wonder,'

Cropping of Raspberries at Wisley.

	Planted.	1925.		1926.		1927.		1928.		1929.		1930.		1931.	
		Per Row.	Per Acre.	Per Row.	Per Acre.	Per Row.	Per Acre.	Per Row.	Per Acre.	Per Row.	Per Acre.	Per Row.	Per Acre.	Per Row.	Per Acre.
		Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.
Baumforth's Seedling A	1923	3	·2	7	·6	21	1·7	19	1·5	18	1·5	36	2·9	30	2·4
Baumforth's Seedling B.	,,	7	·6	13	1·0	15	1·2	13	1·0	19	1·5	15	1·2	5	·4
Bountiful	,,	8	·6	19	1·5	29	2·3	30	2·4	16	1·3	28	2·3	15	1·2
Devon	,,	5	·4	9	·7	29	2·3	19	1·5	15	1·2	17	1·4	—	—
Lloyd George	,,	22	1·8	39	3·2	50	4·0	38	3·1	30	2·4	16	1·3	20	1·6
Pyne's Royal	,,	7	·6	13	1·0	26	2·1	22	1·8	15	1·2	18	1·5	—	—
Red Cross	,,	5	·4	15	1·2	37	3·0	40	3·2	31	2·5	44	3·6	—	—
Brockett Hall	1924			9	·7	42	3·4	49	4·0	32	2·6	35	2·8	31	2·5
Epicure	1926							12	1·0	10	1·8	13	1·0	27	2·2
Matchless	,,							12	1·0	15	1·2	24	1·9	10	·8
Reward	,,							38	3·1	20	1·6	39	3·2	22	1·8
Rival	,,							12	1·0	15	1·2	23	1·9	16	1·3
Ellis	,,							19	1·5	12	1·0	31	2·5	15	1·2
Lynn's Superb	1927									11	·9	19	1·5	17	1·4
Norfolk Giant	,,									15	1·2	54	4·4	39	3·2
Devon	1928											10	·8	6	·5
Duke of Cornwall	,,											27	2·2	12	1·0
Merton 1/20 B.	,,											10	·8	11	·9
Pyne's Royal	,,											32	2·6	49	4·0
Red Cross	,,											37	3·0	43	3·5

N.B.—In all Tables the weight per acre is given on the assumption of rows being 6 feet apart. The rows are 40 feet in length.

'Laxton's Prolific,' 'Profusion,' 'Paradise Berry,' 'Storrie's Invincible,' 'Winkler's Seedling,' and 'Allenberry.'

There are several seedlings raised at the John Innes Horticultural Institution and at the Long Ashton Research Station and many

Cropping of Raspberries at Merton.

	Planted	1927. Per Row	1927. Per Acre.	1928. Per Row.	1928. Per Acre	1929. Per Row	1929. Per Acre	1930. Per Row.	1930. Per Acre.	1931. Per Row.	1931. Per Acre
		Lbs	Tons	Lbs	Tons	Lbs	Tons	Lbs.	Tons.	Lbs	Tons
Baumforth's Seedling A	1926	7	·6	20	1·6	7	·6	5	·4	15	1·2
Baumforth's Seedling B.	,,	7	·6	7	·6	4	·3	7	·6	18	1·5
Bountiful .	,,	13	1·0	23	1·9	15	1·2	26	2·1	18	1·5
Devon .	,,	15	1·2	19	1·5	10	·8	12	1·0	12	1·0
Lloyd George	,,	23	1·9	26	2·1	17	1·4	5	·4	9	·7
Pyne's Royal	,,	14	1·1	34	2·7	17	1·4	22	1·8	39	3·2
Red Cross.	,,	19	1·5	27	2·2	16	1·3	43	3·5	30	2·4
Brockett Hall	1928							8	·6	24	1·9
Lynn's Superb	,,							9	·7	15	1·2
Epicure .	1929							5	·4	4	·3
Reward .	,,							2	—	17	1·4
Rival .	,,							1	—	20	1·6

Cropping of Raspberries at Osgodby.

	Planted	1928. Per Row	1928. Per Acre	1929. Per Row	1929. Per Acre	1930. Per Row.	1930. Per Acre	1931 Per Row	1931 Per Acre
		Lbs	Tons	Lbs	Tons	Lbs	Tons.	Lbs	Tons
Baumforth's Seedling A .	1926	13	1·0	8	·6	21	1·7	—	—
Baumforth's Seedling B .	,,	11	·9	5	·4	19	1·5	—	—
Bountiful . . .	,,	14	1·1	5	·4	21	1·7	12	1·0
Devon	,,	8	·6	10	·8	48	3·9	—	—
Lloyd George . .	,,	36	2·9	18	1·5	33	2·7	30	2·4
Pyne's Royal . .	,,	8	·6	9	·7	26	2·1	28	2·3
Red Cross . . .	,,	9	·7	20	1·6	17	1·4	39	3·2
Brockett Hall. . .	1928					7	·6	15	1·2

Cropping of Raspberries at Wisbech.

	Planted	1929. Per Row.	1929. Per Acre	1930. Per Row	1930. Per Acre.	1931. Per Row	1931. Per Acre
		Lbs	Tons	Lbs	Tons	Lbs	Tons
Baumforth's Seedling A .	1927	24	1·9	18	1·5	9	·7
Baumforth's Seedling B .	,,	3	·2	12	1·0	9	·7
Bountiful . . .	,,	14	1·1	18	1·5	12	1·0
Devon	,,	10	·8	15	1·2	9	·7
Lloyd George . .	,,	13	1·0	22	1·8	10	·8
Pyne's Royal . .	,,	24	1·9	17	1·4	16	1·3
Red Cross . . .	,,	25	2·0	55	4·4	28	2·3
Brockett Hall . . .	1928			27	2·2	16	1·3

other new introductions growing in the trials, some of which the visiting judges have noted as showing distinct promise and which will possibly be selected for distribution to sub-stations in the near future.

CROPPING OF RASPBERRIES AT DURHAM.

	Planted.	1930. Per Row.	1930. Per Acre.	1931. Per Row.	1931. Per Acre.
		Lbs.	Tons	Lbs.	Tons
Baumforth's Seedling A.	1928	17	1·4	30	2·4
Baumforth's Seedling B.	,,	20	1·6	16	1·3
Bountiful	,,	21	1·7	21	1·7
Brockett Hall	,,	37	3·0	35	2·8
Devon	,,	18	1·5	25	2·0
Lloyd George	,,	23	1·9	27	2·2
Lynn's Superb	,,	15	1·2	11	·9
Pyne's Royal	,,	15	1·2	23	1·9
Epicure	1929			23	1·9

Summary.

The three most satisfactory varieties in the trials are 'Lloyd George,' 'Red Cross' and 'Pyne's Royal,' and these are now regarded as standard varieties for comparisons of vigour, fertility and quality of fruit, with 'Norfolk Giant' as the most promising late variety. 'Red Cross' and 'Pyne's Royal' have now replaced 'Baumforth's Seedling A' and 'Baumforth's Seedling B,' which were previously bracketed with 'Lloyd George' as the "standard" varieties. For planting in private gardens, 'Lynn's Superb' is recommended, in addition to 'Red Cross' and 'Pyne's Royal.'

RED CURRANTS.

The varieties selected as standards with which to compare other varieties under trial were 'Fay's Prolific' and 'Wilson's Long Bunch.' From the varieties under trial at Wisley, 'Perfection' and 'Laxton's No. 1' were selected as showing commercial promise and distributed to the sub-stations in 1927. 'Earliest of Fourlands,' a variety of continental origin, was distributed in 1928. Twenty bushes of each of these are planted at the stations.

These bushes have only now reached good bearing age, and the following notes show the main characteristics of the varieties.

Fay's Prolific.—This well-known variety, raised by LINCOLN FAY in Chatauqua, New York, in 1868, has not made satisfactory bushes at any station. The shoots "blow out" badly in positions at all exposed, and it is difficult to build up good bushes under field conditions. The flowers of this variety show well before any leaf is made. The berries are very large and are borne in very long bunches. The fruit ripens early and quality is good, and where strong, up-standing bushes have been grown, cropping has been heavy and regular. The difficulty experienced in building up large, well-branched bushes limits

the suitability of this variety for commercial planting, and it is not recommended.

Wilson's Long Bunch, sometimes called 'Victoria.'—This variety makes rather spreading bushes of moderate vigour. Leaves are large, brownish-green, and are held flat. The fruit ripens late and the berries are of medium size, light red in colour and held well apart in long, loose bunches. The variety has cropped only moderately well. At the outset, difficulty was experienced in obtaining true stock of the variety, and it appears there are mixed stocks in circulation.

Perfection (Laxton).—This variety has made rather small, spreading and sparsely branched bushes. Shoots are stout, often "blind" (without healthy buds), and are very apt to "blow out" or break down to the ground. Everywhere difficulty has been experienced in building up good bushes. Leaves are large, rugose and brownish-green. Bunches are very long and berries very large—the largest of any (fig. 83), even in size throughout and well flavoured. Very heavy crops have been carried by this variety—remarkably heavy for the small, badly-shaped bushes grown. The fruit is of excellent quality, setting the standard of size and quality desirable; but owing to the habit of "blowing out" and the unsatisfactory bushes, it is a variety which cannot be recommended for commercial planting.

Laxton's No. 1 (Laxton).—This variety makes large, sturdy and rather spreading bushes, furnished with stout branches. Leaves are large, light green, and are held flat. The fruit ripens fairly early and is borne in medium to long bunches. Berries are of medium size—sometimes large, bright red and of good quality. This has cropped remarkably well at all stations and is recommended as a variety well suited for commercial planting in all districts.

Earliest of Fourlands (raised by R. ROSENTHAL in Germany and sent by Messrs. BATH).—This makes strong, erect, compact bushes of the 'Prince Albert' group. Leaves are large, a little upfolded at the edges and are dark green. Unlike other varieties which fall into this group, this variety ripens its fruit early. Berries are large, bright red, and borne in moderately long bunches. This variety has made good bushes, has cropped heavily at all stations and shows promise of becoming a valuable early variety for commercial planting, but further trial is necessary before any definite recommendation can be made.

GOOSEBERRIES.

Two well-known varieties, 'Leveller' and 'Lancashire Lad,' were selected as standards. In the planting season of 1927–8 'Gautrey's Earliest' and 'Green Gem' were distributed to the stations, 'Bedford Yellow' was distributed in 1928–9, and 'Bedford Red' in 1929–30. Twenty bushes of each of these varieties are established at the stations.

The bushes are not yet old enough to enable the judges to form any definite opinion upon the commercial qualities of the varieties.

Gautrey's Earliest (a chance seedling, introduced by Messrs. GAUTREY in 1923) shows promise as a Gooseberry for picking green early, the fruit reaching marketable size as early as any and earlier than most. It is of somewhat drooping habit of growth, but even on young bushes has cropped heavily, the berries when ripe being dull red.

Green Gem (Laxton, 1922) is a dessert fruit of good flavour and the variety makes thick, compact bushes of good vigour.

Bedford Yellow (Laxton, 1920) is an excellent dessert fruit also, but much less robust in growth than some varieties, and it is intolerant of sulphur in any form.

Bedford Red (Laxton, 1922), makes very strong, somewhat spreading bushes and bears heavy crops of well-coloured dessert fruit.

PLUMS.

Of the twenty-two Plums and Damsons under trial (fig. 84) three have been recommended for extended trial at the sub-stations, these being:

Early Laxton.—This was raised by crossing 'Jaune Hâtive' and 'Early Orleans' and introduced by Messrs. LAXTON of Bedford in 1919. The chief value of this Plum as a commercial variety lies in the early ripening of the fruit. At Wisley the plums have ripened at the end of July, a week or ten days before the fruit of 'River's Early Prolific,' trees of which are growing close to the 'Early Laxton' trees in the trial grounds. The Plums are of medium size, oval or a little rounded and attractively coloured yellow with a faint red flush and much lavender "bloom" on the skin. It is a free-stone plum, with juicy, golden flesh of fair dessert quality, and at Wisley the trees have cropped well over a period of several years. The variety has not made large trees, being only moderately vigorous and making a medium-sized, round-headed tree. The shoots are markedly downy, slender, and somewhat brittle. The flowers open a little early, but after several other varieties are in blossom. The variety is reported to be self-fertile.

Laxton's Gage was raised by crossing 'Green Gage' and 'Victoria' and introduced by Messrs. LAXTON in 1922. This is a large, oval, golden-yellow plum of fair dessert quality. At Wisley the trees have cropped well, the fruit ripening usually a little before 'Victoria.' Growth is vigorous, making large, rather spreading trees more sparsely branched than 'Early Laxton.' It is reported to be self-fertile.

Cambridge Gage.—This Greengage is said to have originated in Cambridgeshire and is grown extensively by Messrs. CHIVERS of Cambridge, from whom the material under trial was obtained. The fruit is almost indistinguishable from the old Greengage, being of medium size, round, dull green or greenish-yellow when fully ripe, and useful for dessert and for preserving. The fruit ripens after 'Czar' and before 'Victoria.' Growth is moderately vigorous, making an upright-spreading tree. It is said to succeed when grown on its own roots, and in the trials trees are grown on various root-stocks and on their

own roots, to discover the best method of growing. It is said to be slow in coming into bearing, but this may be only when grown on its own roots, for trees in the trial grounds on certain stocks, planted in 1924, have carried good crops during the past three and four seasons. Experiments show that the variety is partly self-fertile but likely to yield a good crop only when provision for cross-pollination is made.

APPLES.

The number of varieties accepted for trial is now one hundred and eight. This number includes several unnamed seedlings raised at the Long Ashton Research Station and at the John Innes Horticultural Institution, Merton, and several varieties raised by Mr. T. W. MACOUN at the Dominion Experimental Farm, Ottawa. Trees of these varieties are established in the trial grounds at the Central Station, Wisley, in blocks of forty trees of each variety—the Canadian varieties excepted, which are planted in smaller numbers as a preliminary test. Many varieties have reached an age when judging committees are able to form opinions of their probable commercial worth. On the recommendations of the judges two varieties have been eliminated from the trials as unsuitable for commercial growing and seven varieties have merited recommendation for distribution to the sub-stations to undergo further trial in the different districts. They are as follows:

Laxton's Superb.—A late dessert variety to follow 'Cox's Orange Pippin' in season, raised by Messrs. LAXTON, by crossing 'Wyken Pippin' and 'Cox's Orange Pippin.' This variety is extensively planted in some districts and is rapidly gaining favour with growers as a variety to follow 'Cox's Orange Pippin,' the normal season being from December to the end of February.

Fruit is of medium size, a little large from young trees, regular and even in outline, conical or a little rounded, and firm. The apples present a somewhat dull appearance when grown in some districts, being flushed with dull red on a greenish-yellow base; often, however, they are entirely covered crimson and present an attractive sample of good dessert quality. The trees at Wisley have grown well (fig. 84), are vigorous, upright-spreading in habit, and have carried very heavy crops over a period of several years.

Trees of this variety were planted at the sub-stations in the winter of 1927–8, and in most districts the trees on dwarfing stocks are now in bearing.

Those sub-stations not already growing trees of 'Cox's Orange Pippin' adjacent to the trial plot were supplied with trees of this "standard" variety so that comparison of growth, cropping, etc., might be made with 'Laxton's Superb.'

Herring's Pippin.—This variety was raised by Mr. HERRING of Leicester and introduced by Messrs. PEARSON of Lowdham in 1917.

It is a remarkably highly coloured dual-purpose apple of medium to



FIG. 53. RED CURRANT PERFECTION
(p. 266)

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FIG 84 —APPLE 'LAXTON'S SUPERB' (p 268).

[*To face p.* 269.

large size, round or a little flattened and in season during October and November. The fruit is almost entirely covered with a rich crimson flush over a mellowed yellow base; attractive in appearance and the most highly coloured apple in the trials. The skin is rather tender and apt to bruise easily if roughly handled, which character may limit the value of the variety for wide commercial planting.

The trees at Wisley have cropped very heavily and regularly. Growth is moderately vigorous and the habit of the tree upright and compact, becoming more open and spreading as it matures. Trees of this variety were planted at the sub-stations in the winter of 1929–30 and are making good progress.

St. Cecilia, a late dessert variety, is a seedling raised from 'Cox's Orange Pippin' (other parent unknown) by Mr. J. BASHAM and introduced by Messrs. BASHAM of Bassaleg in 1918. This appears a promising variety to follow 'Laxton's Superb,' the fruit keeping firm and sound until late in March. The apples are of medium size, firm, rather more conical than 'Cox's Orange Pippin,' usually covered with a dull red flush and of excellent quality and flavour.

The trees at Wisley are of moderate vigour, upright-spreading in habit, with stout branches well furnished with spurs. Cropping, however, while not so heavy and regular as with some other varieties, has been satisfactory. Possibly much of the fruit on mature trees may be a little below good commercial size for this type of apple unless crops are heavily thinned, but that is a point further tests at the sub-stations will decide. 'St. Cecilia' is susceptible to damage by lime-sulphur, the trees in one season having suffered partial defoliation by post-blossom applications of lime-sulphur. Trees of this variety were planted at the sub-stations in the winter of 1930–31.

Crawley Beauty is a late-keeping culinary variety of uncertain origin, introduced by Messrs. CHEAL of Crawley in 1906. The fruit is of medium to large size, flattish, brightly striped and flushed red, and in season until late April.

At Wisley the trees have cropped very heavily and regularly. 'Crawley Beauty' makes a flat, rather spreading tree, growth being vigorous; it is the latest of all apples in the trials to come into flower —a little later than 'Royal Jubilee'—and has escaped frost damage in spring when other commercial varieties, as 'Bramley's Seedling' and 'Newton Wonder,' have suffered. Trees of this variety were planted at the sub-stations in 1930–31.

Monarch, a late-keeping culinary variety, was raised by crossing 'Peasgood's Nonsuch' and 'Wellington,' and introduced by Messrs. SEABROOK of Chelmsford in 1918.

The fruit, in season until April, is large to very large, round or a little flattened, firm, and a clear pale yellow, flushed with light red. It is a fine apple when cooked in any form. Growth is vigorous, making large, sturdily branched, round-headed trees, which, at Wisley, have cropped very heavily over several seasons, young trees cropping very freely.

The variety is now extensively planted in some districts, and further tests at the sub-stations (where trees were planted in the winter of 1931–32) may show that it deserves to be even more widely known.

Lord Lambourne is a mid-season dessert variety raised by crossing 'James Grieve' and 'Worcester Pearmain,' and introduced by Messrs. LAXTON—who are the raisers—in 1923. The fruit is of medium size, evenly shaped, reasonably firm, almost wholly covered bright red, and at its best from the middle of October to November, following 'Ellison's Orange' in season. The trees on all stocks have cropped outstandingly heavily and regularly, and considerable thinning of crops has been necessary in most seasons. Growth is moderately vigorous, making upright, compact trees. The variety was planted at the sub-stations in the winter of 1931–32.

Arthur Turner.—This is a mid-season culinary variety, parentage unknown, introduced by Messrs. TURNER of Slough in 1915. The fruit is large to very large, round-oblong and flattened at the base, firm, greenish-yellow, with a faint brown flush when ripe. It is in season from September to November, and as a commercial variety its place probably is as a large green apple for marketing early in the season, the fruit attaining considerable size early. The trees are vigorous, upright-spreading, and remarkably fertile, those at Wisley having cropped very heavily over several years. The variety is being propagated for distribution to the sub-stations in the coming season.

In addition to the seven varieties mentioned the committee selected in 1927 ten 'McIntosh Red' seedling Apples raised by Mr. MACOUN of Ottawa for preliminary test at the sub-stations. Three trees of each variety were planted at the sub-stations in the winter of 1927–8, the varieties being 'Ascot,' 'Joyce,' 'Patricia,' 'Thurso,' 'Hume,' 'Lobo,' 'Lawfam,' 'Pedro,' 'Melba,' 'Stonetosh.'

In 1928 a further ten new varieties were received from Ottawa and recommended for preliminary test at the sub-stations, these being 'Forpear,' 'Linda,' 'Macross,' 'Newtosh,' 'Stonecrop,' 'Emilia,' 'Stonehenge,' 'McSweet,' 'Milfor,' 'Fortosh.'

CANNING TESTS.

Particular attention is being paid to the selection of varieties of all kinds of hardy fruits for canning, and arrangements have been made for fruit of varieties of Raspberries, Strawberries, Currants, Plums and Blackberries, etc., growing in the trial grounds at Wisley, to be sent each season to the Fruit Preservation Research Station at Campden to test their canning qualities. Fruit of several varieties has now been tested over a period of three years.

Wisley is favourably situated for this work, as it is possible to have the fruit picked in the morning and railed to Campden, so that it is canned during the afternoon of the same day.

The following is a brief summary of the results so far obtained :

Raspberries.—About twenty-seven varieties have been tested, and for the third year in succession the variety ' Ellis ' stands out in a class by itself for good colour. The berries are a deep, dull red, round and firm in texture when canned, providing an excellent sample. Unfortunately, the variety has not cropped regularly and heavily in the trials. The stock is at present heavily infected with disease, while the " rubbery " texture of the berries, their dull colour and poor quality makes them unsuitable for marketing and punnets. Attempts are being made to improve the stock by selection, and trials will be continued.

' Lloyd George ' and ' Pyne's Royal ' have canned very well, and ' Norfolk Giant ' is also very good, the fruit keeping its shape when canned and being satisfactorily coloured and flavoured. ' Red Cross ' is reported as moderately good, but lacks the good colour of certain others. ' Duke of Cornwall,' ' Epicure,' and ' Brockett Hall ' have also canned well. Other varieties have proved less satisfactory.

Strawberries.—Of the Strawberries sent for testing, the variety ' Sir Joseph Paxton ' has proved outstandingly the best, berries being of good shape, firm and well coloured. ' Or du Rhin ' and ' Aberdeen Standard ' are reported as good, and ' Deutsch Evern ' as rather too soft, poor in flavour and not altogether suitable. So far, we have discovered nothing among the new varieties to equal ' Sir Joseph Paxton,' but it is reported that preliminary tests with the variety ' Brenda Gautrey,' now undergoing trial, have given good results.

Currants.—The two varieties of Red Currants, ' Laxton No. 1 ' and ' Earliest of Fourlands,' have given good results, and when canned there appears no noticeable difference between them. Of the Black Currants tested, ' Davison's Eight ' has given best results. When canned the fruit is a better colour and flavour than that of some other varieties, and, in addition, the berries have a tender skin which, with canned currants, is a most desirable character.

Plums.—The ' Early Laxton ' variety has canned most successfully. It is a yellow plum with a pink flush and can be used in its yellow stage as a golden plum, while when coloured it can be made, with the addition of a small quantity of colouring matter, quite as attractive as ' Victoria,' while it is reported that the skin is not so noticeable and does not peel so badly as the ' Victoria.' When canned the fruit is pleasantly flavoured and the syrup is bright red.

The canning tests are being continued, special attention being directed to blackberries in order to find the variety most suitable for the purpose.

Further reports on the behaviour of varieties in the trials will be published from time to time as new varieties come to maturity in the trials, so that growers may be informed of available new fruits and make their selections accordingly.

APPENDIX I.

THE following notes, indicating qualities desirable in fruits intended for growing for market, are drawn up as an aid to the Fruit and Vegetable Committee in selecting varieties which come before it for inclusion in the tests of commercial fruits. They are not intended to indicate desirable characters in fruits for private gardens.

N.B.—*Important.*—Fruits unable to bear rough handling, and unlikely to travel well, are useless. Qualities giving ease of packing are an advantage.

In general, new varieties which extend the season of British-grown fruits, both earlier and later, are worthy, other things being equal, of particular consideration.

APPLES.—DESSERT.

SEASON.—Fit for use over a long period.	5
Not clashing with existing varieties unless decidedly superior.	5
COLOUR.—Attractive, red generally preferred.	11
SIZE.—Average, 3 in. in diameter. The larger the better.	7
SHAPE.—Even, globular. Ribbing and other irregularities detract from commercial value. Shallow eye and cavity an advantage.	6
FLAVOUR.—Sweet, refreshing and aromatic.	6
SKIN.—Thick, not greasy.	4
FLESH.—Mellow, not dry, firm, yellow.	4
CORE.—Small, axile.	2

APPLES.—CULINARY.

SEASON.—As above.	10
COLOUR.—Clean, clear. Different markets have different tastes in this direction.	6
SIZE.—Must be large.	10
SHAPE.—As above.	8
FLAVOUR.—Acid, aromatic. Sweetness is an advantage.	5
SKIN.—Thick, smooth.	5
FLESH.—Firm, but tender when cooked.	3
CORE.—Small, axile.	3

PEARS.—DESSERT.

SEASON.—As for Apples, but successive ripening desirable in late varieties.	12
SIZE.—Preferably large.	12
SHAPE.—Circumference more important than length.	5
FLAVOUR.—Sweet, aromatic, sub-acid.	10
SKIN.—Clean, colour unimportant.	3
FLESH.—Buttery, juicy, not gritty.	5
CORE.—Small, axile.	3

PEARS.—STEWING.

SEASON.—As above.	10
SIZE.—As above.	15
SHAPE.—As above.	5
FLAVOUR.—Sub-acid, aromatic.	5
SKIN.—Clean.	5
FLESH.—Tender when cooked, not gritty.	6
CORE.—Small, axile.	4

PLUMS, FOR COOKING, AND DAMSONS.

SEASON.—As for Apples.	8
COLOUR.—Attractive, preferably red or purple.	8
SIZE.—Large.	10
SHAPE.—Elliptical, or round.	5
FLAVOUR.—Sub-acid, rich.	5
SKIN.—Thick, tough.	5
FLESH.—Firm, juicy.	6
STONE.—Free, small.	3

PLUMS.—DESSERT.

SEASON.—As for Apples. Earliness desirable.	8
COLOUR.—Attractive.	8
SIZE.—Preferably large.	10
SHAPE.—Immaterial.	0
FLAVOUR.—Sweet, rich.	12
SKIN.—Thick.	5
FLESH.—Firm, juicy.	5
STONE.—Free, small.	2

RASPBERRIES.

SEASON.—As for Apples. Earliness desirable.	8
COLOUR.—Bright, retaining colour when picked.	12
SIZE.—Large.	10
DRUPELS.—Not too large, held tightly together.	6
SHAPE.—Conical fruits generally travel better.	5
FLAVOUR.—Sweet. Acidity desirable for preserving.	4
CORE.—Free, easily "plugged" or "slipped," smaller the better.	5

CURRANTS.—BLACK.

SEASON.—Very early or very late. Simultaneous ripening of berries in cluster desirable.	8
SIZE.—Large.	10
FLAVOUR.—Sweet, sub-acid.	8
SKIN.—Tough.	6
FLESH.—Firm.	6
BUNCHES.—Large and long. Fruits nearest spur at least 1 inch down stalk.	8 4

CURRANTS.—RED AND WHITE.

SEASON.—As above. Simultaneous ripening of berries essential.	8
COLOUR.—Bright, retaining colour when picked.	10
SIZE.—Large.	10
FLAVOUR.—Sweet, sub-acid.	4
SKIN.—Tough.	6
FLESH.—Firm.	4
BUNCHES.—Long, large.	8

GOOSEBERRIES.

SEASON.—Earliness important, for use when green.	6
COLOUR.—Decided, bright.	8
SIZE.—Large.	10
SHAPE.—Elliptical or round.	8
FLAVOUR.—Sweet and rich for dessert.	8
SKIN.—Thick. "Tops," or dead flowers, should not easily become detached. Hairy varieties not so desirable.	10

STRAWBERRIES.

SEASON.—Earliness valuable.	8
COLOUR.—Bright, clear.	10
SIZE.—Large.	8
SHAPE.—Conical or wedge-shape preferred.	4
FLAVOUR.—Sweet, brisk, aromatic.	6
FLESH.—Firm, solid.	10
SEEDS.—Neither prominent, nor deeply embedded; yellow, not brown.	4

CHERRIES.

SEASON.—Extended in both directions.	8
COLOUR.—Bright and clear.	8
SIZE.—Large.	8
FLAVOUR.—Brisk, sweet.	9
SKIN.—Tough, not liable to crack.	9
FLESH.—Firm, juicy, and aromatic.	5
STONE.—Small.	3

APPENDIX II.

Descriptive Notes of Varieties Distributed for Trial.

RASPBERRIES.

Baumforth's Seedling A.

Fruit.—Large, round, little flattened, dull red, soft, juicy, sub-acid. Receptacle medium size. Druplets medium to large, packed fairly tightly. Easily plugged, but crumbling when picked. Mid-season, ripening successively over long period. Poor dessert qualities; good for preserving.

Fertility.—Prolific.

Summer Canes.—Vigorous, 5 to 6 feet, numerous, green tinged reddish-purple. Glabrous; glaucous. *Spines.*—Not conspicuous, numerous, much same colour as cane, tip little darker; long, stout, stiff. *Leaves.*—Large, held nearly flat, finely rugose; dark, dull or bluish-green. Petiole medium to long, stout, with many inconspicuous stiff spines.

Winter Canes.—Strong, tall, pale bluish-grey at base, upper half chestnut-brown, sometimes little reddish. *Spines.*—Numerous, long, stout, down-curved, light brown.

Much disease in stock, which considerably impaired cropping.

This is generally considered the original 'Baumforth's Seedling,' raised by Mr. J. Baumforth of Pontefract, and introduced in 1880.

Baumforth's Seedling B.

Fruit.—Medium to small, conical, dark red, firm, juicy. Sweet. Receptacle small. Druplets small, tightly packed. Easily plugged, not crumbling when picked. Early-ripening over long period. Fair dessert quality.

Fertility.—Fairly productive.

Summer Canes.—Moderate to weak, 3½ to 4½ feet. Little spreading, very numerous and crowded in row. Green with reddish-purple tinge. Glabrous; glaucous. *Spines.*—Few, conspicuous, short, often very small; darker than cane, purple at base. *Leaves.*—Medium size, generally curled under, finely rugose; dark, dull green. Petiole long; few spines, often none.

Winter Canes.—Slender, crowded; light brown, purple-brown and slightly glaucous near base. *Spines.*—Few, small.

Considerable disease in stock.

This is most commonly grown as 'Baumforth's Seedling' in commercial plantations, but is not the original variety of this name.

Bountiful.

Fruit.—Medium to large, bluntly conical, bright red turning darker; firm, juicy, sweet. Receptacle medium size. Druplets medium, tightly packed. Not easily plugged and difficult to pick. Mid-season, continuing late. Good dessert quality.

Fertility.—Prolific.

Summer Canes.—Vigorous, moderately stout, semi-upright, 5 feet; numerous, crowded; green, tinged reddish-purple. Glabrous; glaucous. *Spines.*—Conspicuous, numerous, short, strong; base of spines usually little darker than cane. *Leaves.*—Large, held flat, coarsely rugose, light grey-green. Leaves at cane-tip paler. Petiole rather short, stout, reddish-purple, darker at base. Few spines.

Winter Canes.—Long, stout, pale; glaucous at base, upper half chestnut-brown. *Spines.*—Long, stout, little curved downwards, more numerous at base.

Little disease in stock.

Raised and introduced by Messrs. Laxton, Bedford, in 1911. Award of Merit, August 1916.

Devon.

Fruit.—Large, conical-oblong, rounded, deep red, moderately firm, juicy. Sweet. Receptacle medium. Druplets medium to large, fairly tightly packed. Easily plugged, not crumbling. Late ripening, rather short season. Good dessert quality for preserving.

Fertility.—Prolific (when free from disease).

Summer Canes.—Strong, stout, semi-erect, 4½ to 5 feet, numerous. Green, turning reddish-purple. Glabrous; glaucous. *Spines.*—Not conspicuous, numerous on upper half; short, stout, base of spine same colour or very little darker than cane. *Leaves.*—Large, broad, generally little curled under, often much curled, tips often twisted over; coarsely rugose; dull grey-green; petiole short, stout, with many small spines.

Winter Canes.—Moderately long, stout, purple and chestnut-brown, glaucous. *Spines.*—Scattered, not numerous, mostly curved downwards; short, stiff, light brown.

Considerable disease present in stock.

Raised 1900 and introduced 1904 by Mr. George Pyne of Topsham.

Epicure.

Fruit.—Medium to large, round-conical or oval; bright red early, turning rather dark. Little soft, juicy. Sweet. Receptacle medium size. Druplets large, packed tightly. Apt to crumble when picked. Little early ripening.

Fertility.—Has cropped well.

Summer Canes.—Vigorous, semi-erect or very little spreading, 5 to 6 feet, numerous; pale at base, reddish-purple above. Glabrous; glaucous. *Spines.*—Not conspicuous, stout, base nearly same colour as cane. *Leaves.*—Large, much curled under, tips folded down, coarsely rugose; dark green.

Winter Canes.—Tall, stout, grey at base, appear half chestnut-brown or reddish; glaucous. *Spines.*—Fairly numerous at top and base; long, little curved down, brown.

Little disease in stock.

Raised and introduced by Messrs. Harraway.

Lloyd George.

Fruit.—Large, long, conical, rounded at end; bright red early, turning dull; firm, juicy. Sub-acid. Receptacle very long. Druplets medium size, packed tightly. Easily plugged, not crumbling when picked. Early, ripening successively over long period.

Fertility.—Very heavy cropper.

Summer Canes.—Stout, erect, 5 to 6 feet. Very numerous, crowded, densely pubescent; glaucous, grey-green, turning light brown. *Spines.*—Numerous, stout, small, conspicuous, darker than cane. *Leaves.*—Large, held nearly flat, rugose, deep green. Petiole long, many large spines.

Winter Canes.—Stout, vigorous, grey-brown, purplish near top, pubescent, glaucous. *Spines.*—Numerous, dark purple, stout, straight.

Little disease, but considerable in some stocks.

Introduced by Mr. J. J. Kettle of Corfe Mullen. Award of Merit, 1919; First Class Certificate, 1922.

Lynn's Superb.

Fruit.—Large, conical or round; very bright red, not turning dark; soft, juicy. Sweet. Receptacle medium. Druplets rather large, packed rather tightly. Easily plugged, crumbling when picked. Early, rather short season.

Fertility.—Has cropped heavily.

Summer Canes.—Moderately vigorous, stout, erect, 4½ to 5 feet; fairly numerous; pale, turning reddish-purple near top. *Spines.*—Small, scattered, dark at base. *Leaves.*—Large, deep green, little curled under; rugose.

Winter Canes.—Vigorous, stout, erect, pale at base; upper half chestnut-brown. *Spines.*—Few on upper half, numerous near base; stout, small, straight, inconspicuous.

Free from disease.

Raised by crossing 'Superlative' and 'Bath's Perfection' by Mr. T. R. Lynn, Emneth, in 1915, and introduced by him in 1924.

Matchless.

Fruit.—Large, bluntly conical; bright red, not turning dark; moderately firm, borne on long pedicels. Sweet. Receptacle medium size. Druplets medium, tightly packed. Easily plugged, not crumbling when picked. Early, continuing over long season.

Fertility.—Has cropped heavily.

Summer Canes.—Vigorous, stout, semi-erect, 5 to 6 feet, pale green, turning reddish-purple. Glabrous. *Spines.*—Not conspicuous, pale, darker at tips. *Leaves.*—Large, held nearly flat, sometimes slightly down-curled, finely rugose.

Winter Canes.—Moderately stout, pale at base, upper half reddish-brown. *Spines.*—Moderately numerous, long, thin, weak, little curved down, light brown.

Little disease.

Raised by crossing 'Bath's Perfection' and 'Superlative,' and introduced by Mr. A. J. Morgan. Award of Merit (under name 'Reliance'), 1925.

Norfolk Giant.

Fruit.—Medium to large, conical, bright red, firm, juicy. Sub-acid. Berries borne on long pedicels. Receptacle medium, druplets medium, tightly packed. Easily plugged, not crumbling when picked. Ripening late. Good for preserving.

Fertility.—Has cropped very heavily.

Summer Canes.—Vigorous, erect, 6 feet, very numerous, green turning reddish-brown. *Spines.*—Few, not conspicuous. *Leaves.*—Large, long, held flat, leaflets little down-folded; finely rugose; grey-green. Petiole long, green, few small spines.

Winter Canes.—Stout, numerous, erect, bright chestnut-brown; glaucous. *Spines.*—Few, short, dark; not conspicuous.

No disease.

Introduced by Mr. H. Goude, Norwich, about 1926.

Pyne's Royal.

Fruit.—Large to very large, conical, deep red, firm, juicy. Sweet or little sub-acid. Receptacle medium. Druplets large, packed tightly. Easily plugged; not crumbling when picked. Early. Good dessert quality.

Fertility.—Has cropped heavily.

Summer Canes.—Moderately vigorous, produced somewhat sparsely, stout, nearly erect, 4½ to 5 feet; dark reddish-purple. Glabrous, glaucous. *Spines.*—Conspicuous, few, often absent on upper part of cane; short, stout, usually darker than cane. *Leaves.*—Large, much down-folded, curled and twisted

sideways; finely rugose; dull, deep green. Petiole medium, reddish-purple; few dark spines.

Winter Canes.—Strong, stout, light brown turning reddish-purple; pale at base. Glaucous. *Spines.*—Very few, inconspicuous, small, little down-curled; darker than cane.

Little disease.

Raised 1907, and introduced, 1913, by Mr. Geo. Pyne, Topsham.

Red Cross.

Fruit.—Medium to large, uniformly good size; conical or rounded, light red early, turning dull. Little soft, juicy. Sweet. Receptacle medium to small. Druplets medium size, tightly packed. Easily plugged; not crumbling. Early, ripening successively over long period.

Fertility.—Prolific.

Summer Canes.—Moderately strong, numerous, nearly erect, but bending over at top; pale green, tinged light purple. Pubescent. *Spines.*—Not conspicuous, moderately numerous, stout, stiff, light-coloured, base same colour as cane. *Leaves.*—Large, broad, flat or convex, little curled under, rugose, light grey-green. Petiole stout, tinged purple, base darker purple, few small stiff spines.

Winter Canes.—Tall, stout, bending over; dull purple-brown, thinly glaucous at base. *Spines.*—Numerous, recurved, little darker than cane.

Very little disease.

Raised and introduced by Mr. George Pyne, Topsham, in 1917.

Reward.

Fruit.—Medium to large, bluntly conical, sometimes round; bright red, not turning dark. Moderately firm; rather dry. Sub-acid. Receptacle medium size. Druplets medium, tightly packed. Easily plugged; not crumbling. Early, ripening successively over long period.

Fertility.—Has cropped heavily.

Summer Canes.—Vigorous, 5 to 6 feet, not numerous, semi-erect; green, tinged purple on upper half. Glabrous, glaucous. *Spines.*—Numerous, long, reddish-purple and darker than cane. *Leaves.* Medium, narrow, pointed, held flat, finely rugose; dull grey-green. Petiole long, reddish-purple.

Winter Canes.—Tall, erect, stout, glaucous at base, upper half reddish-brown. *Spines.*—Numerous, little down-curved, long, weakly, dark purple.

No disease.

Raised by Messrs. Laxton, Bedford. Award of Merit, 1925.

Rival.

Fruit.—Large, conical or oval; dull red, not turning dark; firm, juicy. Sub-acid. Receptacle medium size. Druplets medium size, tightly packed. Easily plugged; not crumbling when picked. Mid-season and continuing until late.

Fertility.—Has cropped well.

Summer Canes.—Moderately vigorous, erect, numerous, 5 feet, green with reddish-purple tinge. Glabrous. *Spines.*—Few scattered, small, stout, darker than cane. *Leaves.*—Large, flattish or slightly down-curled. Rugose, dark green. Petiole stout, few small spines.

Winter Canes.—Moderately strong, stout, light grey at base, upper half deep red brown. *Spines.*—Few, stout, small, dark purple.

No disease.

Raised 1907 by Messrs. Laxton, Bedford.

BLACK CURRANTS.

Baldwin.

Bush.—Moderately vigorous, compact. Coming into leaf early—earliest of all.

Inflorescence.—Racemes 2 or 3 in cluster, medium length, little rigid and curved. Pedicels medium to short, curved.

Flowers.—Opening early, crowded, medium to large. Sepals reddish in bud, flushed pink when open. Petals and calyx and tube yellow-green. Style generally on level with stamens.

Leaves.—Medium, slightly rugose, flat, dark green, thick, leathery. Central lobe tapering, pointed; lateral lobes short, broad. Margin regular, acute. Petiole, medium, thick, green, tinged pink; leaf twisted over. Basal sinus rather deep, narrow; lateral sinus, shallow, broad.

Bunches.—Medium. Average 8 berries in bunch.

Berries.—Medium to large, even, basal berry away from stem. Skin tough. Acid. Ripening late; hanging late.

Shoots (*winter*).—Thin, medium length, often with slight twist. Light brown or grey.

Buds.—Medium to large, conical, downy, pale green tinged pink. Prominent, protruding. Scales loosely wrapped, ragged.

Blacksmith.

Bush.—Large, spreading, very vigorous. Coming into leaf mid-season, rather late.

Inflorescence.—Racemes usually 2 or 3 in cluster, long, held out. Pedicels medium, often pink tinged.

Flowers.—Opening mid-season, medium size, not crowded. Sepals blotched red-purple. Petals pale green. Style often above stamens.

Leaves.—Large, rugose, flat, dark green. Lobes variable. Basal sinus deep, narrow.

Bunches.—Long, loose, usually 6 to 9 berries in a bunch.

Berries.—Medium, skin little tough. Sub-acid. Ripening mid-season; little late.

Shoots (*winter*).—Medium length, slender, grey or light brown.

Buds.—Medium to small, pointed, pale green tinged pink Little protruding. Scales not tightly wrapped.

Raised by Messrs. Laxton of Bedford, and introduced 1916.

Black Tony (fig. 82).

Bush.—Large, spreading, vigorous. Coming into leaf mid-season.

Inflorescence.—Racemes medium to short, lax.

Flowers.—Opening mid-season, medium size. Sepals blotched pink. Petals long, overlapping, pale yellow-green. Style above level of stamens.

Leaves.—Large, broad, smooth, flat, dark green. Central lobe short, broad; lateral lobes short. Margin irregular crenate. Petiole long, thick, green. Basal sinus shallow, broad; lateral sinus shallow.

Bunches.—Medium length, usually 6 to 8 berries in a bunch held out, loose.

Berries.—Medium size, skin tough, sub-acid. Ripening mid-season.

Shoots (*winter*).—Long, stout; buff-grey, dull.

Buds.—Small, plump, pointed; pale green tinged purple. Little protruding. Scales tightly wrapped.

Raised in Friesland, Holland, about 1895, and introduced by Mr. E. Klooster-huis, Uckfield, in 1925.

Boskoop Giant (fig. 77).

Bush.—Large, spreading, vigorous. Coming into leaf second early.

Inflorescence.—Racemes 1 or 2 in cluster, frequently single, long, held straight out. Pedicels long, held out.

Flowers.—Opening second early, widely spaced on raceme, large. Sepals reddish-purple in bud and much bloom, deep red when expanded. Petals pale yellow-green, depressed in centre. Calyx tube golden or bronze. Style generally little above stamens.

Leaves.—Large, rugose, flat, thick; dark green, Central lobe short, broad; lateral lobes long and broad. Margin often irregular, crenate. Petiole, long, thick; green tinged red. Leaf twisted over. Basal sinus deep, narrow; lateral sinus rather shallow, narrow.

Bunches.—Long, usually 8 to 10 berries in a bunch.

Berries.—Large, even, little flattened at sides. Skin tender, flesh soft. Sweet. Ripening early.

Shoots (winter).—Long, stout, light brown or buff.

Buds.—Medium to large, broad, a little rounded, red purple, carmine at base. Little protruding. Scales usually tightly wrapped.

Raised by Mr. Hoogendyk of Boskoop, Holland, and introduced by Messrs. Bunyard of Maidstone in 1895.

Climax.

Bush.—Medium to large, compact, moderately erect, vigorous. Coming into leaf mid-season.

Inflorescence.—Racemes long, usually in pairs, held out. Pedicels short.

Flowers.—Opening mid-season. Medium to large. Sepals deep red in bud with much bloom, blotched pale pink when expanded. Petals pale. Calyx tube yellow-green. Style often reaching above stamens.

Leaves.—Medium, little rugose, little up-folded. Dark glossy green. Central lobe long, tapering; lateral lobes short, broad. Margin regular, dentate. Petals thick, green; leaf twisted over. Basal sinus deep, narrow; lateral sinus shallow, narrow.

Bunches.—Short, usually 4 to 6 berries in a bunch, held out.

Berries.—Medium to small, crowded in bunch; skin tough. Sub-acid. Ripening mid-season.

Shoots (winter).—Long, stout, silvery or pale grey.

Buds.—Small—one of the smallest of any—plump, rounded; pale, tinged pale dull pink. Little protruding. Scales tightly wrapped.

Raised by William Saunders, Ontario, from a seedling of Naples, about 1887.

Daniels' September.

Bush.—Very large, little spreading, vigorous. Coming into leaf early—a few days after 'Baldwin.'

Inflorescence.—Racemes 2 or 3 in cluster, often single. Medium to short, held out. Pedicels medium, little curved.

Flowers.—Opening early, large. Sepals blotched deep red. Petals pale yellow-green. Style generally on level with stamens.

Leaves.—Large, rugose, flat or down-folded, thick leathery; dark green. Central lobe long, tapering; lateral lobes long. Margin regular and acute. Petiole long, thick; green tinged red or purple; leaf bent over. Basal sinus deep, broad; lateral sinus shallow, narrow.

Bunches.—Medium length, usually 5 to 8 berries in bunch.

Berries.—Medium to large, even; skin tough. Acid. Ripening late, hanging latest of all.

Shoots (winter).—Medium length, stout, dull chestnut-brown.

Buds.—Variable, medium to large, little larger than 'Baldwin,' plump; green, tinged dark reddish-purple, sometimes highly coloured. Protruding. Scales little loosely wrapped, ragged tufts at tips.

Introduced by Messrs. Daniels of Norwich in 1923. Said to be a sport (parent unknown); first noticed in 1915.

Davison's Eight (fig. 79).

Bush.—Medium size, semi-upright, vigorous. Coming into leaf early.

Inflorescence.—Racemes medium length, held out. Pedicels long.

Flowers.—Opening early, medium to small. Sepals blotched pink. Petals yellow-green. Calyx tube pale. Styles generally above, often on level of stamens.

Leaves.—Medium, slightly rugose, little down-folded. Central lobes short, broad; lateral lobes short, broad. Margin regular, dentate. Petiole thick, green; leaf bent over. Basal sinus little deep, broad; lateral sinus shallow, broad.

Bunches.—Medium to short, usually 5 to 7 berries in bunch.

Berries.—Medium to large, even, ripening evenly. Skin thin, but little tough. Sub-acid. Ripening little earlier than 'Seabrook's Black.'

Shoots (winter).—Medium length, slender, buff-grey.

Buds.—Medium to small, broad, pointed or rarely blunt, pale tinged pink. Little protruding. Scales tightly wrapped.

Raised by Mr. Geo. Davison and introduced by Col. Petre of Westwick, Norfolk, in 1926.

Goliath.

Bush.—Medium to large, markedly erect, vigorous. Coming into leaf early.

Inflorescence.—Racemes usually 3 to 5 in cluster, crowded, short, rigid, tip up-turned. Pedicels variable; basal pedicels long, apical ones short.

Flowers.—Opening mid-season, crowded, medium to small. Sepals pale, deep red in bud, flushed pink when expanded. Petals yellow-green. Calyx and tube bright yellow-green or golden. Styles generally little above stamens.

Leaves.—Medium to large, rugose, down-folded, tips curled under. Central lobe irregular, long; lateral lobes irregular, short. Margin irregular, dentate. Petiole slender, green pubescent; leaf twisted over. Basal sinus shallow, broad; lateral sinus deeper and narrow.

Bunches.—Short, usually 4 to 7 berries in bunch. Basal berry close to stem.

Berries.—Very large, little uneven in size. Soft. Skin thin, easily broken. Sweet. Ripening mid-season.

Shoots (winter).—Long, stout, buff or light brown.

Buds.—Medium size, sometimes small and crowded on shoot. Generally not quite so large as Victoria. Conical, pale green tinged pink. Generally little protruding. Scales loosely wrapped, ragged, tip golden-brown.

A selection from Victoria (fig. 78).

Invincible Giant Prolific (fig. 80).

In general characters this is indistinguishable from 'Goliath.'

Raised and introduced by the late Mr. D. Storrie of Glencarse in 1915.

Matchless.

Bush.—Medium, compact, erect, moderately vigorous. Coming into leaf early.

Inflorescence.—Racemes usually 2 to 4 in cluster, crowded, medium length, held out. Pedicels short.

Flowers.—Opening little early, small, pale. Sepals flushed pink. Petals yellow-green. Style often below stamens.

Leaves.—Somewhat small, smooth, nearly flat, thick; dark green. Central lobe short, broad; lateral lobes short, broad. Margin regular, crenate. Petiole thick, green; leaf twisted at right angles. Basal sinus shallow, broad; lateral sinus shallow, narrow.

Bunches.—Short, usually 4 to 6 berries in bunch, held out.

Berries.—Medium to large; skin tender. Sweet. Ripening mid-season.

Shoots (winter).—Medium length, stout, grey-brown.

Buds.—Small, conical pale—paler than Goliath—tinged purple at base. Little protruding. Scales closely wrapped.

Raised by Mr. H. Jones of Peplow in 1919.

Mite Free.

Bush.—Medium, compact or little spreading, vigorous. Coming into leaf little late.

Inflorescence.—Opening mid-season, medium to large. Sepals blotched pink. Petals pale. Calyx tube yellow-green. Style often above stamens.

Leaves.—Medium, rugose, almost glabrous, dark green. Central lobe short, broad; lateral lobes short, broad. Margin regular, crenate. Petiole thick, green. Basal sinus shallow, broad; lateral sinus deep, narrow.

Bunches.—Medium to short, held out. Usually 6 to 8 berries in bunch.

Berries.—Medium to small, skin tender, sub-acid. Ripening mid-season.

Shoots (winter).—Long, slender, grey or light brown.

Buds.—Medium, pointed, light green tinged deep pink. Little protruding. Scales tightly wrapped.

Raised (1900) and introduced by Messrs. Laxton in 1925.

Nigger (fig. 81).

In general character this variety is closely allied to 'Goliath,' and differs from 'Invincible Giant Prolific' only in the time of bud-breaking—'Nigger' coming into leaf a few days later.

Origin unknown. Introduced by Mr. E. Beckett, Aldenham, in 1925.

Raven.

Bush.—Medium to large, little spreading, vigorous. Coming into leaf early.
Inflorescence.—Racemes usually 1 or 2 in cluster, long, held out. Pedicels long.
Flowers.—Opening little early, large. Sepals blotched red. Petals pale. Style often reaching above stamens.
Leaves.—Large, flat, rugose, milky-green. Central lobe long, broad; lateral lobes long. Margin often irregular, crenate. Petiole long, thick, green; leaf twisted over. Basal sinus deep; lateral sinus little deep, narrow.
Bunches.—Long, usually 6 to 9 berries in bunch.
Berries.—Large, even, skin tender. Sweet. Ripening second-early.
Shoots (winter).—Long, stout, buff or greyish.
Buds.—Medium, plump, little longer and not so broad as Boskoop Giant, dull purple, tinged red. Little protruding. Scales usually tightly wrapped.
Raised by crossing 'Boskoop Giant' and 'Baldwin,' and introduced by Messrs. Laxton, 1925.

Seabrook's Black.

Bush.—Large, semi-erect, vigorous. Coming into leaf little late.
Inflorescence.—Racemes 2 or 3 in cluster, long, held out, often down-curved. Pedicels short, held out at angle to peduncle.
Flowers.—Opening mid-season, medium size. Sepals blotched red. Petals yellow-green, depressed in centre. Calyx tube light yellow-green. Style often reaching above stamens.
Leaves.—Large, broad, nearly flat, slightly rugose, dark green, medium thickness, leathery. Central lobe short, broad; lateral lobes short, broad. Margin regular, dentate. Petiole medium, slender, green with pink tinge; leaf turned over. Basal sinus shallow, very broad; lateral sinus narrow.
Bunches.—Medium to long, usually 6 to 8 berries in bunch.
Berries.—Medium, little flattened at sides, skin tough. Acid. Ripening second-early or mid-season.
Shoots (winter).—Long, slender, grey or light buff, downy.
Buds.—Medium, plump, conical, dull purple red, carmine at base. Little protruding. Scales tightly wrapped, tips golden brown.
Origin unknown, introduced by Messrs. Seabrook of Chelmsford in 1913.

Supreme.

Bush.—Medium size, upright or little spreading, compact, vigorous. Coming into leaf early.
Inflorescence.—Racemes usually 2 or 3 in cluster, short, little rigid. Pedicels variable.
Flowers.—Opening second-early, crowded, medium to large. Sepals very short, reddish in bud, blotched pink when open. Petals overlapping, yellow-green. Style generally on level with stamens.
Leaves—Medium, rugose, dark green, leathery. Central lobe long, tapering; lateral lobes long. Margin regular, dentate. Petiole medium, slender, green, pubescent; leaf twisted over. Basal sinus shallow, broad; lateral sinus deep, narrow.
Bunches.—Long, average 9 or 10 berries in bunch.
Berries.—Medium to large, even. Skin little tough. Acid. Ripening little late.
Shoots (winter).—Long, rather slender, often curved or twisted. Brownish grey, pale chestnut near top.
Buds.—Large, long, plump, dull pink or whitish, base darker, tips golden brown. Generally little away from stem. Scales loosely wrapped.
Raised by Mr. H. Jones of Peplow by crossing 'Hatton Black' and 'Hatton Giant,' 1919.

Taylor's.

Bush.—Medium size, compact, erect, moderately vigorous. Coming into leaf very late.
Inflorescence.—Racemes usually 1 or 2 in cluster, short, lax, tip down-turned.
Flowers.—Opening late, medium size. Sepals deep lavender in bud, entirely dark claret when expanded. Petals set far apart, pale yellow. Calyx tube light green. Style generally above level of stamens.

Leaves.—Medium size, rugose, flat, sometimes slightly up-folded, deep green. Central lobe short, broad; lateral lobes short. Margin irregular, dentate. Petiole thick, green; leaf twisted right angles. Basal sinus little shallow, broad; lateral sinus shallow, narrow.

Bunches.—Short, usually 5 or 6 berries in bunch, held out.

Berries.—Medium to small, little flattened. Skin tough. Sub-acid. Ripening late.

Shoots (winter).—Medium, slender, brown or buff, shiny.

Buds.—Medium, narrow, pointed, dark red-purple or carmine. Little protruding. Scales tightly wrapped.

Origin unknown, sent for trial by Mr. G. M. Taylor of Portobello in 1923.

Wallace Seedling.

Bush.—Medium to small, compact, moderately vigorous. Coming into leaf early.

Inflorescence.—Racemes usually 2 to 4 in cluster, medium length, little drooping, curved.

Flowers.—Opening little early, medium. Sepals blotched pink. Petals and calyx tube yellow-green. Style often on level with stamens.

Leaves.—Large, rugose, almost glabrous, flat, dark green. Central lobe long, broad; lateral lobes short, broad. Margin regular, dentate. Petiole thick, green; leaf twisted over. Basal sinus deep, narrow; lateral sinus shallow, narrow.

Bunches.—Long, usually 8 or 9 berries in bunch, basal berry close to stem.

Berries.—Medium size, skin tough. Moderately sweet. Ripening little late.

Shoots (winter).—Medium length, slender, buff or light brown.

Buds.—Medium to large—little larger than 'Baldwin'—plump, whitish, tinged carmine. Protruding. Scales loosely wrapped.

Raised and introduced by Messrs. Wallace of Eaton Bray about 1924.

Westwick A.

Bush.—Large, flat, spreading, moderately vigorous. Coming into leaf mid-season.

Inflorescence.—Racemes often single, medium length, held out.

Flowers.—Opening mid-season, medium to large. Sepals blotched pink. Petals pale, touching at base. Calyx tube yellow-green. Style generally reaching above stamens.

Leaves.—Medium size, rugose, little down-folded, dark green. Central lobe short, broad; lateral lobes short, broad. Margin regular, dentate. Petiole thick, green; leaf twisted over. Basal sinus shallow, broad; lateral sinus deep, narrow.

Bunches.—Long, lax, usually 6 to 8 berries in bunch.

Berries.—Medium to small. Skin little tough. Sub-acid. Ripening mid-season.

Shoots (winter).—Medium, little slender, light brown.

Buds.—Large, long, pale green tinged pink. Protruding. Scales loosely wrapped.

Raised by Mr. G. Davison, 1913, and introduced by Col. Petre of Westwick.

Westwick C.

Bush.—Large, very spreading, vigorous. Coming into leaf little late.

Inflorescence.—Racemes usually 2 or 3 in cluster, medium to short, held out.

Flowers.—Opening little early, medium size, pale. Sepals blotched red. Petals yellow-green, long, narrow. Calyx tube yellow-green. Style generally reaching above stamens.

Leaves.—Large, rugose, down-folded, dark green. Central lobe long; lateral lobes short, broad. Margin regular, crenate. Petiole thick, green; leaf twisted over. Basal sinus deep, narrow; lateral sinus shallow, broad.

Bunches.—Medium to short, 5 to 7 berries in bunch, little lax.

Berries.—Medium to large, skin little tough. Sweet. Ripening mid-season.

Shoots (winter).—Long, stout, grey or yellow-brown.

Buds.—Medium size, plump, long, pointed, pale green tinged red. Little protruding. Scales not tightly wrapped.

Raised by Mr. G. Davison, 1913, and introduced by Col. Petre of Westwick.

Wellington's Triple X.

Bush.—Vigorous, rather spreading. Coming into leaf with 'Boskoop Giant.' Second-early.

Inflorescence.—Racemes 2 to 3 in cluster, long, held out.

Flowers.—Opening second-early.

Leaves.—Large, rugose, flat, dark green.

Bunches.—Long.

Berries.—Large, skin little tough. Sweet. Ripening little later than 'Boskoop Giant.'

Shoots (winter).—Long, stout, light chestnut-brown, often grey.

Buds.—Medium, rounded, crimson, except on the top, which is greenish-white.

Raised by Mr. R. Wellington in 1913, and sent for trial by the East Malling Research Station in 1927.

APPLES.

Arthur Turner.

Culinary, October to November, large to very large, round, bluntly conical, flattened at base, sometimes slight ribbed, often regular. Colour, yellow with brown flush. Flesh white or greenish-white, slightly acid, rather dry, moderately firm. Eye large, open, segments short, broad, tips reflexed, in a deep and wide, irregularly ribbed basin; yellow colouring extending into basin. Stem very short, stout, rarely more than ¼ in. long, in a deep, wide cavity. Core medium size, cells rather small, obovate, axile. Tube funnel-shaped, often extending (open) to centre of core; stamens marginal.

Growth vigorous, upright, little spreading. Leaf large, oblong or oval, tip short, acuminate, serrate towards tip, crenate on lower half, stipules small, narrow. Shoots (winter), very stout, long, chocolate-brown with greenish tinge, pubescent. Lenticels numerous, small, round to elliptical, fairly conspicuous. Wood buds, small to medium, blunt, downy; leaf scar wide and pronounced. Fruit buds, medium to large, variable, usually pointed and stout, reddish-chestnut, occasionally completely covered with grey down, scales tightly wrapped. Bourse, extremely large and conspicuous, numerous, much swollen, short, grey-green with much woolly down. Fertility good.

Flowers large, white flushed deep pink.

Parentage unknown; introduced by Mr. Chas. Turner of Slough in 1915.

A.M. September, 1912.

Crawley Beauty.

Culinary, December to February, medium to large, round-flattened, regular. Colour, greenish-yellow, red stripes and fleckings over light red flush. Flesh firm, greenish-white, acid. Eye large, open, segments stiff, erect, margins not touching, in deep and wide basin which is a little puckered. Stem medium in broad, deep cavity. Core small to medium, cells obovate, axile. Tube funnel-shaped; stamens median.

Growth vigorous, spreading. Leaf medium, roundish, margin crenate, often doubly serrate. Shoots (winter), medium length and thickness, brown, little reddish, pubescent. Lenticels very small, inconspicuous, few, oval or round, occasionally elongated. Wood buds, rather large, little prominent, covered with grey down. Fruit buds, medium, roundish or ovate, short, stout, pubescent, reddish colour, exposed only in small patches. Bourse medium, swollen, very downy. Lenticels fairly conspicuous. Very fertile.

Flowers opening very late, medium, pale.

Parentage unknown; introduced by Messrs. Cheal of Crawley in 1906.

A. M. December 1912.

Herring's Pippin.

Culinary or dessert, October and November, medium to large, round, conical, sometimes flattened. Colour, almost entirely covered with crimson flush over darker streaks of red, shady side flecked with crimson over mellow yellow. Flesh pale yellow, tender, with aromatic flavour, rather soft. Eye large, open, segments short and broad, in little-ribbed, wide, moderately deep basin. Stem very short, stout, in deep and wide cavity: colouring extends just into cavity, which is mostly green or russety. Core medium size, cells obovate, axile. Tube funnel-shaped; stamens median.

Growth moderately vigorous, upright or spreading. Leaf large, oval, acuminate, margin crenate. Shoots (winter), medium, little slender, dull brown covered with grey pubescence. Lenticels small, clay-coloured, elliptical, often much elongated, conspicuous, not numerous. Wood buds, small, short, rather flattened, pubescent. Fruit buds, fairly large, short, stout, ovate, pubescent with reddish-chestnut colour, much exposed. Bourse large, swollen, partially covered with grey down. Lenticels small, not conspicuous. Very fertile.

Flowers large, flushed and blotched deep pink.

Raised by Mr. Herring of Leicester and introduced by Messrs. Pearson of Lowdham in 1917.

A.M. October 1920.

Laxton's Superb (fig. 83).

Dessert, December to February, medium or little large, conical or rounded, flattened at base. Colour, greenish-yellow with crimson flush and brighter crimson streaks and fleckings; sometimes almost entirely covered crimson. Flesh creamy-white or little greenish, firm, juicy and highly flavoured. Eye usually little open, sometimes closed, segments erect, convergent, little reflexed at tips, in rather shallow, slightly plaited basin, which occasionally is coloured. Stem short and knobbed, sometimes long and slender, in fairly deep, russety cavity. Core medium, cells round, axile. Tube conical; stamens median.

Growth vigorous, upright or little spreading. Leaf large, light green, long and tapering, rather narrow, finely, irregularly and often doubly serrate. Shoots (winter), moderately long, slender, little pubescent. Lenticels small, fairly numerous in centre, few and very large near base of shoot. Wood buds, small, blunt, broader than long, very downy, chestnut-brown, showing through in small patches. Fruit buds, small, rounded, bluntly obtuse, deep red-chestnut colouring, only very little exposed; pubescent. Very fertile.

Flowers creamy-pink in bud; creamy-white, irregularly flushed pale pink when open.

Raised by Messrs. Laxton of Bedford by crossing 'Wyken Pippin' and 'Cox's Orange Pippin,' and introduced by Messrs. Laxton in 1922.

A.M. August 1919. **F.C.C.** February 1921.

Lord Lambourne.

Dessert, October to November, medium, evenly rounded, sometimes little flattened. Colour, covered with crimson flush, with faint striping over mellow yellow. Flesh white or creamy, crisp, moderately firm, juicy, well flavoured. Eye open, segments broad, short, in even, wide and rather deep basin. Stem short, not protruding, in fairly deep and wide, evenly rounded cavity. Core medium. Tube conical; stamens median.

Growth moderately vigorous, upright, compact habit. Leaf medium to large, deep green, round or obovate, tip markedly acuminate, margin irregularly and frequently doubly serrate. Shoots (winter), stout, long, chocolate-brown, downy. Lenticels inconspicuous, small, round or elongated, numerous. Wood buds, long, pointed, reddish-brown, little pubescent. Fruit buds, large, longer than wide, little pubescent, dark reddish-chestnut beneath down. Very fertile.

Flowers pale pink in bud; open, white, flushed pink with deeper-coloured veining.

Raised by Messrs. Laxton of Bedford by crossing 'James Grieve' and 'Worcester Pearmain,' and introduced by Messrs. Laxton in 1923.

A.M. October 1925.

Monarch.

Culinary, keeping until end of March or April, large, round, often flattened, even in outline. Colour, pale yellow, turning white, with faint red flush and thin striping and blotching of light red. Skin smooth, slightly greasy, with shallow pitting or "hammered" appearance over entire surface. Flesh greenish-white, with creamy tinge beneath skin, firm, crisp, sub-acid. Eye large, wide open, segments short, broad, reflexed at tips, in wide, shallow, slightly plaited basin. Stem very short, in moderately deep, slightly russet cavity. Core medium; cells wide, axile, ovate-round. Tube broad, conical; stamens basal.

Growth vigorous, upright and little spreading. Leaf large, deep green, rounded, with distinct and sharp tapering to tip, coarsely crenate, often doubly crenate. Shoots (winter), stout, rather short, dull brown, pubescent. Lenticels numerous, conspicuous. Wood buds, rather small, short, broad, covered with short grey down. Fruit buds, short, ovate, chestnut or reddish, pubescent. Very fertile.

Flowers creamy-pink in bud; open, large, overlapping petals, blotched and striped deep pink.

Raised by Messrs. Seabrook of Chelmsford by crossing Peasgood's 'Nonsuch' and 'Wellington,' and introduced by Messrs. Seabrook in 1918.

St. Cecilia.

Dessert, January to March, medium, conical, flattened at base. Colour, greenish-yellow with red-brown flush and light red striping. Skin smooth and shining. Flesh greenish-white, firm, juicy, well flavoured. Eye closed, segments long and reflexed, in moderately deep, narrow basin. Stem very short, often knobbed, sometimes ½ in. long, and thin, in moderately wide, shallow cavity. Core medium, cells obovate, abaxile. Tube funnel-shaped; stamens marginal.

Growth vigorous, upright and little spreading. Leaf medium, oval, acuminate with rather short tip, coarsely and irregularly serrate, often doubly serrate. Shoots (winter), rather slender, reddish or chocolate-brown, little pubescent. Lenticels few, conspicuous, usually round. Wood buds, medium, prominent, covered with white down, red-brown beneath. Fruit buds, large, stout, ovate, pubescent. Bourse medium, little swollen, short, pubescent. Lenticels few, small, not conspicuous.

Flowers medium size, flushed and veined pink.

A seedling from 'Cox's Orange Pippin' (other parent unknown), introduced by Messrs. Basham of Bassaleg in 1918.

A.M. January 1918. **F.C.C.** January 1919.



FIG. 85 — THE PLUM TRIAL GROUND AT WISLEY
(p. 267)



FIG 56 — EXHIBIT OF APPLES FROM THE ITALIAN IMPERIAL FRUIT SHOW MANCHESTER 1931

To face p 285

APPLES FROM THE COMMERCIAL FRUIT TRIALS, WISLEY, AT THE IMPERIAL FRUIT SHOW, 1931.

AT the Imperial Fruit Show held at Manchester from October 30 to November 7, 1931, an exhibit of apples from the Commercial Fruit Trials, Wisley, was arranged (Fig. 86).

The object of the exhibit was to bring to the notice of fruit growers a selection of the many new and little-known varieties of Apples of commercial promise growing in these trials and to demonstrate the nature and extent of the experimental work which the Society—in co-operation with the Ministry of Agriculture—is conducting at Wisley and at sub-stations established in several counties, in order to discover and test under varying conditions new varieties of all kinds of hardy fruits likely to be of value for commercial planting.

Fruits of sixty-five Apples that are actually under trial at Wisley were staged, along with specimens of a few well-known " standard " varieties—which enabled comparison to be made with the newer varieties of similar type and season.

Prominent in the exhibit were the six varieties which, after having been grown and fruited for some years at Wisley, have been selected by appointed judges for extended trial, and are now planted at the sub-stations—at Long Ashton (Somerset), Emneth (Norfolk), Osgodby (Yorks), Merton (Surrey), Perdiswell (Worcester), and Elbridge (Cornwall). These are the dessert Apples ' Laxton's Superb,' ' Lord Lambourne,' and ' St. Cecilia ' ; the culinary varieties ' Monarch ' and ' Crawley Beauty,' and ' Herring's Pippin,' which is a highly coloured dual-purpose Apple.

Others to figure prominently were ' Millicent Barnes,' a highly coloured dessert Apple, following ' Worcester Pearmain ' in season ; ' Morley's Seedling,' a large, green, late-keeping culinary Apple ; ' Arthur Turner,' a very large, mid-season culinary Apple, and ' Opalescent,' a brightly coloured late-keeping dessert Apple of American origin.

Among several other new varieties, ' Woolbrook Pippin,' ' A. W. Barnes,' ' George Carpenter,' ' Victory,' ' Barnack Orange,' ' Peter Lock,' ' King George V,' ' Macey,' ' John Standish,' ' Alderman,' ' Wagener,' ' Edward VII,' ' Crimson Newton Wonder,' and ' George Neal ' were well shown.

The older standard varieties shown included ' Ellison's Orange,' ' Cox's Orange Pippin,' ' Heusgen's Golden Reinette,' ' Barnack Beauty,' ' Lane's Prince Albert,' ' Lord Hindlip,' ' Egremont Russet,' ' St. Edmund's Russet,' ' American Mother,' ' Brownlee's Russet,' and ' Paroquet,' and of these it is interesting to note that the ' russet '

Apples attracted most comment and enquiry from visitors to the show.

The high colouring of many of the varieties—a character usually well developed in the Apples grown under the conditions existing at Wisley—and the promising commercial form and quality of certain of the newer varieties impressed many interested growers. The exhibit was of much educational value and served to emphasize the importance of this comparatively recently established branch of the Society's activities at Wisley.

CHINESE LILIES.

By F. C. STERN, O.B.E.

[Read July 5, 1932; Col. L. R. MESSEL in the Chair.]

THERE are no more beautiful plants in our gardens than Chinese Lilies.

I should like to see hundreds of *Lilium regale* in every herbaceous border and dozens of *L. centifolium* on the shady side among shrubs and *L. Henryi* among the shrubs on the sunny side; then hundreds of *L. Duchartrei* var. *Farreri* on the banks of streams and *L. Wardii* running about in half shady places, and so on.

Most of the Chinese Lilies are very easy to propagate either by seed, as *L. regale*, or by their bulbs increasing very quickly, as in *L. Henryi*; there is little difficulty in their cultivation if given the right conditions. There should be hundreds of these Lilies in our gardens; they are equally suitable for small gardens and large ones; they want little looking after when planted except to see that slugs and other pests do not injure the young shoots when they first come out of the ground. Most of them like any ordinary soil; they have none of the whims and fancies of the Japanese Lilies which refuse to grow in lime, or the peculiarities of the American Lilies which do not really like Europe. There are one or two that do not like lime which I will mention as I go along, and one, *L. Henryi*, that hates an acid soil; while most of the rest, given good drainage and a good loam, will do well with or without lime.

Most of them are simple to propagate either by seed or bulbils, or by their stoloniferous character of running along underground making bulbs, or by their making a mass of bulbs which can be easily broken up. I will deal with the propagation of each species as we come to it.

The naming of most of the Lilies is fairly straightforward; where there are well-known synonyms I will mention them. There are a great number of names among the Chinese Martagons, founded on botanical differences which are not of great moment to the gardener. In this group I have followed the masterly essay on the subject by Professor WRIGHT SMITH published in the *Transactions of the Botanical Society of Edinburgh*, vol. xxxviii., and in other groups I have generally followed the excellent work of ERNEST WILSON, "The Lilies of Eastern Asia."

LEUCOLIRION GROUP.

Let us take first the group of trumpet Lilies (Leucolirion) and begin with one of the most beautiful Lilies in existence, and certainly one of the easiest to grow, *Lilium regale*.

ERNEST WILSON found *L. regale* in 1903 in Western Szechwan, and introduced it to England through Messrs. VEITCH in 1905. It loves the sun and grows in any good loam with or without lime, so long as it is well drained. Good drainage applies to the cultivation of all Lilies. It stands to reason that if the soil is water-logged in winter a Lily bulb in it will rot and become diseased. *L. regale* can be increased most easily by seed. Seed should be sown broadcast in the open in the autumn and left for two years. The bulbs can then be dug up and put out in their permanent places in the early autumn; in their third year they will flower, and each year they will have more flowers. They appear to me to begin to go back after about ten years. In July they make a wonderful show, growing up to 4 or 5 feet with anything up to 24 flowers on a stem, and their scent in the evening is delightful.

L. centifolium was found by FARRER in 1913 in Kansu in a cottage garden. It was originally found wild by AUGUSTINE HENRY in 1888, later by WILSON in 1901.

This Lily flowers in the second half of July, earlier or later according to the sort of summer we have. It starts into growth about May 1, and grows at a tremendous rate up to 9 or 10 feet with strong stems; a full-grown plant has between 12 and 17 flowers on a stem. People ask me sometimes what manure we give this Lily, or what we do to it to make it grow so strong. To be truthful, I am much too frightened to do anything at all! It is difficult to start this Lily in cultivation in the open; seedlings and young plants under two years old seem to be not hardy in the open, but after that age they appear to be perfectly hardy. It can be propagated by seed or scales. The seed when sown in the autumn comes up always about the same time, May 1. Our method is to raise the seed in a cold house, and grow the plants on in pots for two years before planting out. One curious point about this Lily worth recording is that although bulbs are planted in the ordinary way, after a year or two they will be found lying on their sides. What is the explanation?

WILSON calls this Lily *L. leucanthum* var. *chloraster*, but Dr. STAPF has named it *L. centifolium* in the *Bot. Mag.*, vol. 148, t. 8960.

L. myriophyllum. ERNEST WILSON in his monograph on Lilies of Eastern Asia describes this Lily, which he found in Yunnan; he considers it a form of the Burmese *L. sulphureum*, which he names *L. myriophyllum* var. *superbum*. Edinburgh Botanic Gardens gave me some bulbils of this Lily some years ago. It has grown and flowered in the open in a hot and sheltered place, the flowers coming into bloom at the end of August. The flowers are white trumpets, narrow towards the base, after the style of *L. sulphureum*, but not so long in the petals or so yellow in colour. This Lily has withstood 14 degrees of frost and is hardier than *L. sulphureum* in my garden. Bulbils are produced in great numbers even on young plants, so there is no difficulty in propagation. Perhaps this Lily is the Chinese form of the Burmese *L. sulphureum*, and coming from the colder climate of Yunnan is hardier.

L. Sargentiae was also found by WILSON in Western Szechwan, and is after the style of *L. regale*, flowering a fortnight later, but with larger flowers, and it produces bulbils on the stem in abundance. It differs from the last, from the gardener's point of view, by the different shape of the flower, which is broad as in the *L. regale*, and the petals, which are brown on the outside. I have always failed to grow this Lily in the open. It appears to me to be not very hardy, although of course it may be the lime that it dislikes. It has grown well in a pot in a greenhouse, and as it is so easy to propagate from bulbils it should be a useful Lily for greenhouse work.

CARDIOCRINUM GROUP.

Lilium giganteum var. *yunnanense* is the Chinese form of the well-known *L. giganteum* and it belongs to the Cardiocrinum group. WILSON reports it as being found in Central and Western China in shady ravines and moist woods between 4,000 and 8,000 feet. It is a magnificent Lily, quite easy to grow under these conditions, and will tolerate lime as long as it has shade and moist woodland soil. It grows up to 8 feet and dies after flowering, as *L. giganteum* does. It can be easily distinguished from *L. giganteum* by the leaves when they first come up. In *L. giganteum* they are green, and in the Chinese form they are a metallic bronze and very beautiful. They gradually turn green as they grow older. A mass of these bronze leaves in a valley in a wood would be a fine sight in spring. Propagation is either by seed sown in the open or the small bulbs formed at the root after flowering. This Lily used to be called *L. mirabile*.

MARTAGON GROUP.

From the point of view of nomenclature this is the most difficult group to get straight. Many explorers have found species in this group in different districts sometimes separated by great distances, and usually growing under different conditions. Each of these finds, when dried, may show some botanical distinction, or again some of these Lilies are highly cultivated by the Chinese either for their beauty or for food, and so there may be many cultivated variations from the wild plant. One must always remember when dealing with Chinese plants that great mountain ranges and vast valleys with tropical vegetation or arid desert divide Western China into isolated botanical regions. In these different regions the same types may grow with certain variations which are of interest to the botanist, but not of great moment to the gardener.

As I have mentioned above, Professor WRIGHT SMITH has worked out all these different forms and classified them in his critical essay on the subject. I am following his nomenclature.

He divides the Martagons found in Western China and the surrounding districts of Tibet, Upper Burma and the Himalayas into five groups, classified by their botanical relationships.

In the first group he includes *L. taliense*, *L. Stewartianum*, *L. ochraceum*, *L. polyphyllum*, and *L. Tenii*.

The only ones in cultivation as far as I know are *L. ochraceum* and *L. polyphyllum*, the latter coming from the Himalayas.

L. ochraceum when first sent home by FARRER from Upper Burma, and FORREST from the Lichiang Range of W. China, was considered a hardy form of *L. nepalense*, but *L. nepalense* is a Trumpet Lily and *L. ochraceum* of FORREST and FARRER is a Martagon. Professor WRIGHT SMITH has made a study of these types and considers that the Chinese form is *L. ochraceum*, a true Martagon, and that the form from Upper Burma is intermediate between the Himalayan *nepalense* and the Chinese *ochraceum*—in other words, an intermediate form between Martagon and Eulirion—and he has named it *L. nepalense* var. *burmanicum*.

Whatever the correct botanical name may be, this plant is a fine Lily, with a large yellow flower blotched inside with dark purple, growing to about 2½ to 3 feet. It is easy to raise from seed. I grew the form collected by FARRER in Upper Burma (No. 1122) in the open for some years in a warm well-drained position, till it was killed by 20 degrees of frost in the winter of 1928–29. It is likely that FORREST'S form collected in Yunnan on the Lichiang and Tali ranges at 10,000 feet will be the most hardy for our gardens.

The next group contains *L. Davidi*, *L. sutchuenense*, *L. Fargesii* and *L. Willmottiae*.

L. Fargesii is not, as far as I know, in cultivation. There has been much controversy about the correct names of the other three. *L. Davidi* used to be called *L. Thayerae*, and *L. sutchuenense* and *L. Willmottiae* are considered by some as the same plant. It would certainly appear that the plant figured in the *Bot. Mag.* 7715 is the plant that is now known as *Willmottiae*. There is no doubt, however, from the gardener's point of view, that *Davidi* and *Willmottiae* are distinct.

L. Davidi is a beautiful upstanding Lily, with a deep orange flower with the petals turning far back, and it has several flowers on a stem. This Lily can be distinguished from the others in this group by the hairiness of the stem, especially by the axil of the leaves. It is easily raised from seed and not difficult to cultivate. It likes a good loam in a sunny place among low shrubs, with good drainage.

L. Willmottiae is also a fine Lily with a larger flower than the last, of a yellower colour; the petals are more separated and turn up and not back as in *L. Davidi*. It has large numbers of the flowers on each stem; the bulb is stoloniferous, and if the position is to its liking it soon makes a mass of small ones. It does best in leaf-mould, where the soil does not get too dry and where there is some shade. It comes well from seed, or can be propagated from the young bulbs formed underground.

It is not at all clear to me whether *L. sutchuenense* does really exist or not. Lilies that I have grown under that name have been poor

forms of *L. Willmottiae*. They have all had the same characteristics of glabrous stems and stoloniferous habit, though the latter is a doubtful botanical character. Professor WRIGHT SMITH points out that the great divergence of these Lilies is no doubt due to their being cultivated intensively by the Chinese both for food and ornament, whereby different forms have been evolved. Professor WRIGHT SMITH considers *L. sutchuenense* a form of *L. Davidi*, but from a garden point of view it appears to me more like a form of *L. Willmottiae*.

In the third group we have *L. Duchartrei*, *L. lankongense*, *L. Forrestii*, *L. Farreri*, *L. papilliferum*, and *L. Wardii*. *L. Forrestii* is not in cultivation; and *L. papilliferum*, which has been collected by FORREST (Nos. 12984, 13006, and 13412) on the Mekong-Salween divide and the Mekong-Yangtze divide, is unknown to me in cultivation. I am including *L. Wardii*, although it was found in southern Tibet, about 400 miles west of where the Salween goes through.

Professor WRIGHT SMITH reduces the first four to forms of *L. Duchartrei*, with which everyone, I think, agrees.

L. Duchartrei var. *Farreri* was found by FARRER on his first expedition to Kansu, and he describes it as the " Marble Martagon haunting cool mountain slopes and river banks." It is a lovely Lily, growing about 2 to 3 feet high, with numbers of delicate white Martagon flowers spotted pink towards the base of the petals. It flowers in July; it likes a sunny position; it is stoloniferous, and in a light loam where there is some moisture in the growing season it runs about in all directions. After some years it forms masses of small bulbs and deteriorates; it should then be moved into new ground, where it revives into extraordinary vigour. It is hardly worth raising from seed, as propagation is so simple by the crowd of bulbs formed underground.

It is described and figured in the *Bot. Mag.* 8847; this plate may be compared with that of *L. Duchartrei* (*Bot. Mag.* 8072), where the latter appears to differ from FARRER'S variety by the deep red of the back of the petals.

L. lankongense is another form of the section Duchartrei. It is figured in WILSON'S Asiatic Lilies. I saw it in the garden of Sir HERBERT MAXWELL, where it was growing in the ordinary loam of the garden among other plants. It appeared to me to be like FARRER'S variety, but a stronger grower with larger flowers—no doubt a geographical variety.

L. Wardii was found by Capt. KINGDON WARD in 1924 in the Tsangse valley, about a hundred miles east of Lhassa, at an elevation of 8,000 to 10,000 feet (No. 6034). The plants were growing in scrub and pine-clad slopes among bracken and Vaccinium. It is a most beautiful Lily, growing about 4 feet high, with pink Martagon flowers and dark stems; it has the stoloniferous habit, and in ground that it likes it is very vigorous. In Colonel MESSEL'S garden at Nymans, in half shade at the end of July, it flowered magnificently, one plant growing to 5 feet high with 37 blooms.

It does not like lime, and grows perfectly in a light loam with plenty of leaf-mould. It was first thought to be *L. taliense.*

The next group contains *L. Bakerianum, L. Lowi, L. Delavayi* and *L. sempervivoideum.*

L. Lowi is a spotted form of *L. Bakerianum,* and *L. sempervivoideum,* which sounds by the description a lovely pink Lily, is not in cultivation.

I have never seen *L. Bakerianum* and *L. Delavayi* growing in the garden, and have only seedlings of them, so cannot give any cultural experiences with regard to them. From their description in WILSON'S "Lilies of Eastern Asia" they are neither in the first rank.

There are two more Martagon Lilies still to describe, and they are two of the finest garden plants.

L. tenuifolium was found by FARRER in Kansu. I mention this only because it is not common in this part of China. Its home is farther to the north, in Mongolia and Siberia. It is a glorious little Lily, about 18 inches high, with sealing-wax red flowers. It likes a sunny position in light soil. The seed germinates freely and should be sown frequently, as the plants die out in three or four years.

L. Henryi was discovered by AUGUSTINE HENRY in 1888. WILSON collected it on the limestone cliffs in the province of Hupeh. It is a gloriously easy Lily, which hates peat. In loamy soil with or without lime this Lily grows up to 8 or 9 feet, and has about a dozen yellow flowers on a head at the end of July. It makes a mass of bulbs in a few years which can be broken up in the autumn. It is best planted among shrubs, as it wants some support. A number of these Lilies make a fine show with their yellow flowers and deep green leaves when other things are going over. It will not grow in peat or acid soils.

NOTHOLIRION GROUP.

There is one species of the Notholirion section, *L. hyacinthinum,* which grows in China, and is, I believe, common from Southern Kansu through Yunnan. It grows extremely well in the garden of Mr. MCDOUALL at Logan, in the south-west of Scotland. There it grows in well-drained peat soil and is a startling sight in June. In size and habit it is much like a red *Galtonia candicans* (*Hyacinthus candicans*); on account of this likeness WILSON named it *L. hyacinthinum*; the bells are a deep red, and in the evening, with the sun shining through them, they are very beautiful. A quantity of seed and bulbs have recently arrived from Capt. KINGDON WARD'S collecting, so perhaps it may become more common in future.

FLOWER DECORATIONS.

By H. Jolis.

[Read January 26, 1932; Mrs. Lindsay Smith in the Chair.]

Let me, first of all, at the beginning of this article, impress on your minds that at heart we are all artists. Most of us think we are, and quite rightly so, because all of us arrange flowers in our own way.

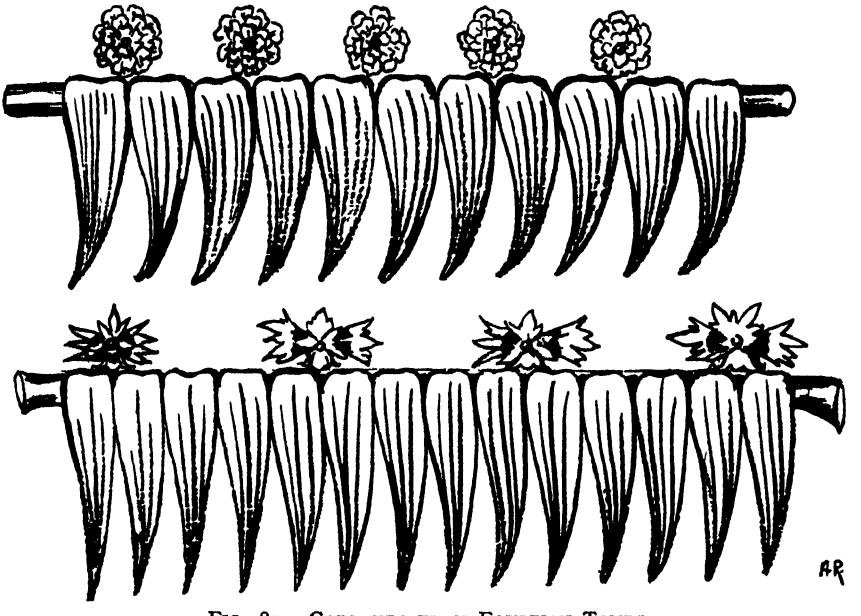


Fig. 87.—Garlands from Egyptian Tombs.

We all think ours is the correct way, but we have all a lot to learn. I, who have been connected with decorations for the last thirty years, am still learning every day.

Flower decoration is one of the oldest arts in the world. We all know the natural tendency of human beings is to decorate their bodies, their homes, and their surroundings. From time immemorial this has been almost their daily occupation. It is only natural that, in trying to make the person, or the home, or the surroundings beautiful, people would look round for the most easily accessible article, which in olden times, and even to-day, would be flowers.

Unfortunately we have no records of flower decoration in prehistoric times. This is rather a pity, for it would be interesting to see what our very remote forefathers had done.

One of the earliest records dates from the Egyptian period. During excavations of tombs in Egypt some flowers were found

in the Tombs of the Kings. Fig. 87 shows garlands of laurel and lotus leaves mixed. At the top of the garland there are small bunches of flowers introduced, and at the top of the bottom garland cornflowers are put in as a colour scheme. The most remarkable thing about this discovery was that not only were these articles found in perfect condition, but the actual colour of the flowers, the blue of the cornflowers, was as fresh as if they had been picked yesterday. There also was found the first real sheaf of foliage (Fig. 88), a sheaf of laurel leaves tied on to the stem of a palm. These garlands were to be hung round the necks of mummies, and the sheaves were placed on the side of the bodies. That sheaf was in perfect condition and shape, and is still to be seen at the Museum in Cairo.

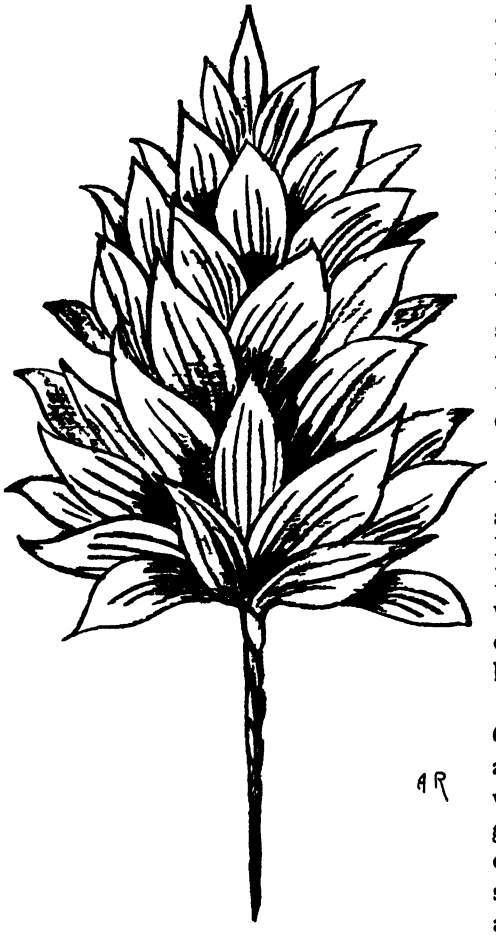


FIG. 88.

Very little is known of the time between the Egyptian and the Persian eras. But Persia was the "land of Roses." In Persia Roses were used as the main decoration, and they were lavishly used.

But we have to go to the Greek period for real floral art. In that period flowers were used for tables, and for garlanding the pillars and decorating the halls. The slave girls were very clever at this type of work, and were highly thought of and well paid for their art. Even in those days floral decoration was a girl's occupation.

Coming closer to the present day, we hear of the use of flowers in Java, the Dutch East Indies. It is the custom in Java, when there is a wedding, for the bride to decorate the bridegroom with flowers. In Fig. 89 we see that the bride, having filled two large bowls with fruit and flowers, and decorated herself, is now decorating the bridegroom with garlands of small flowers. Notice the armlets with a small flower attached.

The most interesting feature of flower decoration is that flowers were not only used to decorate, but they played their part in social

customs and in religious rites. Flowers and their use always had a meaning. I am afraid they have lost something of their meaning to-day. Rather we use flowers more for our own benefit than for any meaning attached to their use.

Let us consider the flower art of the Japanese. It is so totally different from our Western ideas of floral art that one cannot really compare them. The Japanese, when arranging flowers, have an object in view. They have in their rooms the right nook for every type of vase. Each vase is filled in the correct way, and the Japanese artist has always to remember social and religious custom when following his art.

Fig. 90 shows a branch of Apple Blossom arranged in a vase. I want



FIG. 89.—FLORAL DECORATIONS IN JAVA.

you to notice that the upward branches have been arranged to be perfectly straight up. That was not the natural tendency of this branch of blossom, but it has a meaning, and to know that meaning one has to know the life and religion of the Japanese from inside. They spend hours arranging one vase of flowers. You will probably say we cannot all afford to do that, but unfortunately we do not spend enough time over our flower decorations.

The sketch of Wistaria (Fig. 91) shows a different type of decoration. This is the natural way which the Japanese have of showing flowers. I do not know what we believe, but we seem to go against Nature as much as we can! If we tried to take fifty per cent. of the Japanese art and introduce it into our Western art, we should get a perfect scheme of flower decoration.

We can learn a great deal from our own painters. Somehow or other painters have always been in advance of the floral decorator. You can imagine that the year 1800 did not give us much in the way of artistic floral arrangements, but the artists of that period had perfect

lines in their paintings, and perfect harmony of flowers and colour scheme. To explain to you what I mean when I say that painters are ahead of us nearly all the time, I want you to think of the marvellous flower pictures of Fantin Latour, the French flower painter. One can learn a lot from his perfect simplicity and colour schemes in flower decoration.

Now I am coming to what is called our Early Mid-Victorian period,

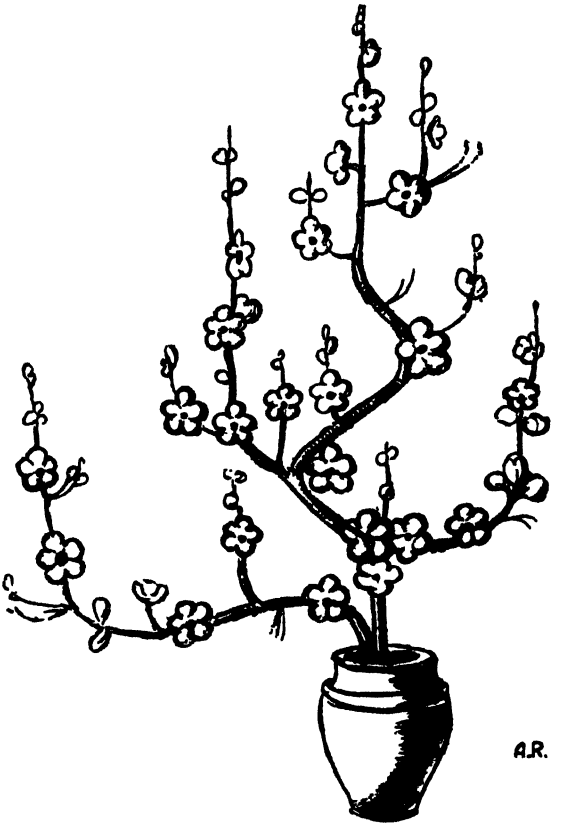


FIG. 90.—JAPANESE ARRANGEMENT OF APPLE BLOSSOM.

the art of our grandmothers' and great-grandmothers' days. That period was a period of stuffy rooms, very little light, drawn curtains, and the best room only used on Sundays. Can you imagine beautiful flower decorations in that period? We know that flowers were used, however, but very sparingly. What our grandmothers used to have were ghastly dried bouquets of Pampas Grass, Phœnix leaves, Honesty, etc. What could you expect in rooms that were only opened once a week? The flower decoration of the Early Victorian type was a bunched pudding-bowl shape of vase.

Do not blame our forefathers for that. They were artists in their way, they could not help it. The gardeners of those days did not grow the beautiful long-stemmed flowers we see to-day, and for which

we should be very thankful. They grew short-stemmed hot-house flowers, so the people of those days could only get effect by clumping them together.

Fortunately, the gardener and the nurseryman began to grow



FIG. 91.—WISTARIA.

longer-stalked flowers, and with the improvement of the flowers the art of their arrangement improved.

After the Victorian period another came. People grew fonder of outdoor life; sport came along, boating, tennis, football, and other pastimes, and with that fondness for outdoor life came a greater love of flowers. In no other country in the world are the people so fond of flowers as they are in Great Britain. When I say "the people" I mean the working class, because you can only judge a nation by its working classes. Nowhere else in the world will you see a man earning two pounds a week or its equivalent, spending a shilling or

two on Saturday night for flowers to take home to his wife; even if it is only a peace-offering! That you see in no other country.

But we have not yet learned to make the best of the flowers we buy. We are letting the marvellous growers of beautiful flowers down badly. I know a little about these gentlemen, and they have let me into their secrets, and what it means to grow beautiful flowers. They make a profit sometimes, but it is not always worth the tremendous trouble they take.

What happens to the beautiful flowers these people grow? Seventy-five per cent. of them are murdered, simply because we lack that little patience, that little thought, that attitude of looking upon the flower as a living thing; something that is there to be looked after like a pet dog. We just buy a bunch of flowers or pick a bunch of flowers, put them in a vase, and that is all. How many people take a little time to think out a scheme of arrangement?

Another person we are letting down very badly is the furnisher, the man who puts up our curtains and decorates the interior of our home. One sees in this country very beautiful fabrics and charmingly painted rooms. We are letting him down because he goes with the times and we spoil his work by staying behind.

To understand the real art of decoration one must realize that in flower decoration there is only one golden rule—that is, "Follow Nature." Nature has a peculiar habit of always radiating from the centre. If we do that with flowers—I mean when arranging a bowl or vase we stick to one centre and radiate from that centre—we shall get a much happier effect than by filling a vase all over the place, as it were (see Fig. 92).

Another great factor to-day is the colour scheme. Colour schemes follow the fashion more than anything else. In the years 1912–13 we were all fond of pinks and blues, and pretty, soft colours. To-day, after we have lived through what most of us have lived through, we prefer the stronger colours.

Not only that, but everything architectural has changed to severe and simple lines, and we floral artists and the public will have to follow the architect; severe lines will have to be introduced into our home flower decoration.

Of late years the ugly, old-fashioned vases have been replaced by more graceful and modern shapes, but it is difficult to fill these new vases; one usually overfills them.

I would like to show you what I call a perfect type of filling—a bowl of Irises (Fig. 92). These flowers are put in as if they are growing on one side of the bowl. This type of decoration has a motive; it is a picture in itself. I dare say some of you think that this bowl looks very empty, but the time has gone by for filling a vase with as many flowers as one can possibly get into it. As you see here, the bowl, which is of the flat, bronze type, is filled according to its shape, and that is an art in itself. You have not only to fill your bowl with flowers, but you have to fill it according to its shape.

If you have a garden, pick your flowers according to the vases you possess. I should not think, for instance, of arranging Tulips in a similar way. They do not look at you, they look up to the sky. If Tulips would stand up in this bowl you would be looking underneath the Tulip.

Many people pick beautiful long-stemmed flowers, and because their vases happen to be unsuitable, cut the stems of the flowers. That



FIG. 92.—IRISES.

is murdering the flowers, and not doing the best with what you have got.

A few branches of Willow mixed in a vase of Tulips give a happy effect. To my idea the way to treat Tulips is to mix every possible colour under the sun. You could not do it with a lot of flowers, but try at home to mix Darwin Tulips of every colour, and you will see what I mean; arranged in one vase they are a delight to look upon. But be careful not to do it with all other flowers. I should not, for instance, try it with Carnations—I do not know why. I suppose it is because the Tulip is an outdoor flower and gets its colour more naturally than the Carnation does.

A new type of decoration, which is really very old, has come into the forefront of late, that is the Early Victorian type. You may think this strange, because I told you it was wrong, but the Early Victorian period was more severe than the present type, and is now called a "Futuristic" style of arranging flowers. You may shriek, and say this is horrible, also that I have told you not to "murder" flowers and here they are "murdered": but it is a style. Do not use this type of decoration in your home unless you live in an ultra-modern house. In a "Futurist" house you would not put what we call a "pretty" vase of flowers, you would put something in keeping with the interior. I have seen a bowl of this type in a house built of steel, glass and cement. As for interior decoration, well, there was none, but a bowl like that looked remarkably well. That shows one cannot lay down the law about art, because I have just said a minute ago this kind of thing is ghastly, and yet it looked beautiful in a certain type of house.

Fig. 93 shows an ordinary type of Antirrhinum vase. Compare this with the bowl in Fig. 92. I used in that bowl fewer flowers than I would in the usual type of vase, yet I consider that the Iris bowl has a far prettier effect, because there I have a motive. The Antirrhinums are just flowers stuck into a vase. Of course, one has to be careful in doing the Early Victorian type of bowl: it is only really suitable for a futurist type of house. Carnations could not be treated in that way, but short flowers such as Anemones, Antirrhinums, or Marigolds would look delightful.

Now I come to the most wonderful decoration of the home which you could possibly have, that is, not flowers but foliage. I think there is nothing more beautiful than a vase filled with foliage, and we do not use it nearly enough.

I am often asked to judge at different shows. A year ago I was invited to judge at a show about twenty miles out of London, and asked what my fees were. I would not take any fees, but as they wanted to pay me in some way or other I said, "Give me sufficient to buy a first prize to give to your exhibitors, and open a new class for the best vase or bowl of foliage." This was a fairly small place, and when I got there I was rather afraid I should not see much in the way of "Art."

However, there were about twenty entries in this particular class, all beautiful. The first prize went to a lady who had used a yellowish-orange-shaded old washing basin, and in it she had arranged Rhubarb leaves, beetroot leaves, and carrot-tops. She could not have created a finer picture if she had been a professional artist. Against nineteen other entries I had to give her the first prize. She was unique; she was an artist. She did not realize she was an artist, for after the show she wanted to know why I had given her the first prize! But we are all, consciously or unconsciously, artists, and can all do something with flowers.

A few good kinds of foliage for use are Pittosporums, which last



FIG. 93. ANTIRRHINUMS

To face p. 300



FIG. 94.—GROUP OF CERIUS AND PILOCERIUS AT MANCHESTER (p. 304).

a long time, and make a very fine show in a bronze vase; Laurustinus, which all know; Berberis, *B. Aquifolium* and *B. Darwinii*; *Cupressus macrocarpa lutea*, Rhododendron, and Ruscus. Have you ever seen a large vase of pine in a lounge? It makes you think you are in the country!



FIG. 95.

Then there are berries: Pernettya, Pyracantha, and Cotoneaster. There are *Prunus Pissardii* and *Spiraea Van Houtei*; these are all more or less well known to you, and I do not know why they are not more used.

Grasses are not used as they should be, especially the graceful Quaker grasses. Some of the ordinary varieties are very effective. Fig. 95 shows how grasses might be used—grasses mixed with Water Lilies. If you introduce grass in this way you will agree with me that

you have a picture; almost a little country scene. You can all do it if you have a flat bowl and use the right type of flowers. You need not have Water Lilies, you can use other flowers. Just put the tall grass or bulrushes in the centre, and the shorter flowers at the base.

To my idea foliage makes the most beautiful decoration, but there is another style, which will be the decoration for the home of the future—bowls planted out with choice foliage plants. One does not see this very often, I think mainly because most houses are not suitable for the type of bowl I have in mind.

The foliage plants for this type of decoration are *Begonia Rex*, *Ficus repens*, Selaginella, *Hibiscus tricolor*, *Dracaena Godseffiana*, *Dracaena Sanderiana*. A bowl filled with this kind of plant is first of all economical; it will last extremely well. It is beautiful because of its peaceful impression; it is like a rare picture. I do not know if I have a weakness for foliage and foliage plants. Perhaps it is because I have so much to do with flowers, but it is a pity one so rarely sees a bowl planted with a few choice foliage plants. If you were to try this type of decoration and place it in your room you would wonder why you had not had a bowl like this long ago, because it is something worth looking at. One should use different types of foliage plants in one bowl, and enjoy the pleasure of seeing them grow and look very beautiful.

You can just imagine this style of bowl in a Tudor house with oak panelling, but the house of the future is going to demand this kind of decoration far more.

We have to think ahead, we have to believe in what is coming to us, because the house of the future is coming, whether we like it or not. You have all seen it in pictures and on the Continent, and in the Ideal Home Exhibition; the house made of steel, cement, and glass, to let in all the air and light, and with central heating. That type of house is coming, and it is for that type we must cater, and we must think of the flower decoration of the future, although we can play about with the present. Foliage plants in bowls are most suitable for the modern house.

Another very delightful decoration is a bowl planted with Echeveria; it is simple, and is quite a delightful decoration for the home. It is not pretty, it is severe, but one has to be careful nowadays not to be too " pretty " in the way of flower decoration.

Yet another modern decoration is made with Cacti. Personally, I do not admire Cacti, but I have seen houses of the modern type where bowls of Cactus plants look rather well. I prefer not to say too much about this form, because I have a personal dislike of the plants, they seem to me so dead, and so expressionless.

I am going to give you an idea for a very pretty home decoration—quite a modern thing. Have a bowl with an object of art introduced into it. You have all at home a beautiful piece of bronze or ivory. Have you ever tried to introduce that into a bowl of plants? If you introduce a little figure into a bowl of foliage plants you can make

a very economical and charming corner in your home. Plant flat Selaginella one side, place your ornament on this, and plant your other foliage plants the other half of the bowl. It will last months, whereas you generally have to renew your flowers twice weekly. This is economical, as well as new.

I should now like to say something about the way flowers are exhibited at the different flower shows. You will remember I said we let the architect down. You will agree with me that the architect who built this remarkable building (the new Hall of the Royal Horticultural Society) must have had in mind something quite different from what we are showing him now. He must have had in mind something more advanced.

There are a few exhibitors who are advancing, and we have seen some very fine features.

I would like to take this opportunity to say that it is a great pity that we do not show flowers for exhibition purposes in, or as near as possible to, their natural state. The most beautiful flowers are shown in the hall, and in several halls in the country, but are they shown in the way they grow, or in some way approaching this! Very rarely are they shown to perfection.

If I had the architect in the room to-day I should say: "Dear sir, what had you in mind?" He would probably say: "I cannot tell you, but it was not this." I feel that this is the best example I could offer in the way of proof that we are not ahead of the times.

If the men who grow these beautiful flowers, and who are professional exhibitors and decorators, cannot show them with the same mind as the modern architect, then what can we expect of the general public? It is those people who exhibit at the trade shows who should show the public how flowers should be arranged.

I would like to see this hall an example of how flowers should be used—I do not like the word "decoration," it seems "shoppy." Flowers, in nine out of ten floral exhibitions and flower shows, are mis-used. It is only half-a-dozen people who show repeatedly, and with whom one is proud to shake hands, who seem to have a soul for flowers. The others simply "murder" them. Instead of the beautiful flower being shown to advantage and doing itself justice, it is simply distributed amongst the lesser ones. I have a feeling that the day will arrive when we shall see flowers shown as they should be shown, but of course that day may be a little way off yet.

CACTI AND OTHER SUCCULENTS.

By W. W. PETTIGREW, V.M.H.

[Read April 26, 1932; Sir WM. LAWRENCE, V.M.H., in the Chair.]

DURING the past hundred years or so it appears from contemporary gardening literature that many gardeners from time to time showed a good deal of enthusiasm for the cultivation of various species of Cacti. In numerous instances it was undoubtedly the desire of bringing together a full and representative collection of these remarkable-looking plants that proved the impetus to this enthusiasm rather than the joy of beholding their floral beauty. On the other hand, it is certain that in the early decades of the nineteenth century the great majority of growers confined their attention to free-flowering species only and used them for purely decorative purposes. In the "Floricultural Cabinet" for 1833 I have recently come across accounts of gardeners getting single plants of *Cereus speciosissimus* to have from 200 to 300 blooms all open at the one time. Needless to say, such plants were not only a testimony to the wonderful skill of the grower but must have been a sight that one could not readily forget. Other Cacti grown at that time on account of their free-flowering habit were various species, hybrids and varieties of Phyllocactus and Epiphyllum. These seem to have had the most careful treatment bestowed upon them in order to induce them to bloom freely. The vogue for these special plants was as recent as fifty years ago, for I well remember when I first commenced my gardening training under my father that an object of considerable pride to him was a fine specimen of a variety of *Epiphyllum truncatum* which he cultivated in a warm stove. Each flowering season this plant was a perfect blaze of colour.

Generally speaking, after the middle of the last century very little attention was paid in private gardens in this country to the cultivation of the Cactus family outside of the three genera just mentioned. Here and there, of course, collectors interested in this and other families of succulents brought together specimens of as many different species as they could get hold of and made a regular study of their cultural requirements. Naturally, the botanical gardens established in the British Isles were among the few places where anything like representative collections of Cacti were to be found.

About forty years ago a fresh interest was awakened in the cultivation of succulents generally and Cactaceous plants in particular. This was probably brought about largely as a result of the late Mr. W. WATSON'S well-known work on Cacti. About the period named, a number of amateurs in various parts of the British Isles took up the cultivation of Cacti and purchased a great deal of their stock from

continental growers who apparently had long made a speciality of the propagation of many different kinds of succulents. So successful were some British amateurs in securing specimens that in time their collections became too large to be housed in the limited glass space at their command, and, rather than dispose of them to nurserymen, their owners offered them to the municipal authorities in their district to be placed in the local public parks. It is within my own knowledge that Cardiff, Birmingham, and Manchester were each the recipients of very good collections of succulents in this way. In addition to these three cities, Liverpool, Glasgow, Hull, and Swansea also possess interesting collections of succulents, all of which are arranged so as to be most accessible to the public.

Interest in the cultivation of Cacti, as in some other branches of horticulture, suffered a very severe set-back during the War and for some time after its close. Not only so, but what previously had been the main source of supplies—continental nurseries—were, in numerous instances, completely destroyed. Fortunately, in this respect, times are becoming normal again and many of the old firms are offering Cacti and such-like in as great a variety as they did twenty years ago. Once again a considerable amount of interest is being aroused in the growing of these plants and a Succulent Society has recently come into being. All lovers of horticulture will, I am sure, wish this new Society every success in its aim to popularize and improve the cultivation of these remarkable and interesting plants.

It may prove interesting for a moment or two to consider the change that has taken place during the past century in the classification and nomenclature of the Natural Order Cactaceae, about which order I shall have the most to say here.

Quite apart from the great number of new species discovered during that period, a marked change has taken place in the classification itself of the various members of the order. For instance, in the 1829 edition of LOUDON'S "Encyclopædia of Plants," mention is made of only two genera of Cacti: Cactus and Rhipsalis. Only seventy-two species are enumerated, of which sixty-seven are placed under Cactus and five under Rhipsalis. Shortly after this date (and until a few years ago) the name Cactus was entirely dropped as a genus, and the species that were at one time included under that name were allocated to a number of other genera.

In BENTHAM and HOOKER'S "Genera Plantarum," published between 1862 and 1880, the N.O. Cactaceae is divided into two tribes, thirteen genera, nine sub-genera and approximately 966 species. It is noteworthy that among the thirteen genera only one of them is monotypic.

In SCHUMANN'S monograph of Cacti, published in 1898, three sub-families or tribes are recognized and these are sub-divided into twenty-one genera which, on the whole, closely approximate to BENTHAM and HOOKER'S arrangement, the main difference being that the sub-genera of the latter are given full generic rank by SCHUMANN.

In passing, I may mention that SCHUMANN'S classification and nomenclature is followed in the Manchester collection, as the donor (Mr. DARRAH) and Dr. SCHUMANN were great friends. SCHUMANN'S key to the classification of Cacti, written in English, was drawn up at the request and expense of Mr. DARRAH, who desired to use it in the arrangement of his own collection.

Messrs. BRITTON and ROSE, in their monograph of the Cacti, published about 1920, divide the order Cactaceae into three tribes, eight sub-tribes, 122 genera, and describe something like 1,197 species. When referring to BENTHAM and HOOKER'S classification, I mentioned that they describe only one monotypic genus, but Messrs. BRITTON and ROSE, on the contrary, describe no fewer than forty-eight of such genera!

From the standpoint of the systematic botanist, this splitting up of a few well-known genera into a great host of new ones may be quite correct and advantageous. From the point of view, however, of the mere collector and cultivator it is, to say the least of it, most confusing and irritating. Not being a botanist I, in my innocence, was quite under the impression that the guiding factor in applying generic names to plants was one of three things. One was that the name itself described some peculiar feature of the group of plants to which it was applied, or was the name by which some members of the genus were known to the ancients, or was given to commemorate the name of some outstanding personality, more especially a botanist. On looking through BRITTON and ROSE'S monograph I was soon disillusioned on this point, for I found that so hard pressed were these authors to find suitable names for their newly founded genera that they had to resort to the expedient of inventing anagrams out of the names of such places as Lima and Bolivia and apply them in the changed form of Mila and Lobivia, to certain species of Cacti found growing in these localities. This is only one example of what appears to me the weakness of their nomenclature. Apart from this criticism, however, one can have nothing but whole-hearted praise for this monumental work on Cactaceae.

Among the municipal collections of succulents in this country, that belonging to Manchester is by far the most outstanding, having a reputation that extends considerably beyond the British Isles. It was originally the property of the late Mr. CHARLES DARRAH, in his time one of the leading commercial men in Manchester. At his death in 1903, his relatives presented the whole of his stock of succulents to the Manchester City Council, who housed them in a range of glass, specially erected for their reception at Alexandra Park.

As an amateur, Mr. DARRAH was so keenly interested in the cultivation of succulents that he spared neither trouble nor expense in securing any representatives of this interesting class of plants that were likely to succeed in his neighbourhood. Not only did he import specimens from the Continent but he even had them brought over from their native habitats in North and South America. In his endeavour to

make a first-class collection he was ably assisted by his head gardener—Mr. COBBOLD—who was equally keen and discerning, with the result that to-day Manchester possesses, thanks to their efforts, a collection of Cacti and other succulents of which any botanical garden might be justly proud. Mr. COBBOLD, I am pleased to say, was appointed curator of the collection when it came into the possession of the Manchester Corporation and has held this position ever since. He has devoted his whole life to the study of succulents and plants akin to them, and it is thanks mainly to his help during the past eighteen years that I know what little I do about these plants.

Although "Cacti and other Succulents" is the subject of which I have been asked to treat, I am afraid my paper will resolve itself virtually into an account of the Manchester collection, and any cultural details that may be mentioned will be those that are practised in Manchester.

In 1903, when the Cacti were presented to the city, Alexandra Park was situated amidst what were virtually country surroundings. This is all changed now as the park is encircled by thousands of houses. On this account it is becoming increasingly difficult to grow these sun-loving plants with anything like success. Species which grew quite satisfactorily thirty years ago have died out within the past few years. Two genera in the original collection—Melocactus and Pfeiffera—have both succumbed, while eighty-one species, mostly of the globose type, have also become extinct. Bearing in mind Manchester's damp climate and smoky atmosphere and comparing them with the conditions in their native habitats in Mexico and California, one can readily understand why it is that our losses have been so great. It is to be feared indeed that unless something can be done within the next few years to purify the Manchester atmosphere—which after all is the dominating factor—the authorities will be confronted with the alternative of either moving the Cactus House some ten miles out into Cheshire (as they have already done with their propagating houses) or presenting the collection to one of the Royal Botanic Gardens.

With the remaining succulents, the mortality has not been so great, as only one genus and seventeen species have died out since they were first housed in Alexandra Park.

To-day, the natural order Cactaceae is represented in the Manchester collection by eighteen genera, 873 distinct species, eighty-two varieties, and twenty-nine hybrids, while other succulents make up fifty-one genera, 520 species, thirty-seven varieties, and seven hybrids.

In consequence of the atmospheric conditions being so trying to their health it is most essential to take extra care both in regard to the potting and the watering of the plants.

The compost generally used for the terrestrial species consists of three parts of Kettering loam, one part of two-year-old leaf-mould, one part of gritty material composed of equal portions of rough sand, ground-up old mortar, and broken bricks. To every three bushels of this

mixture, half-a-pound of slaked lime and half-a-pound of wood ashes are added. The potting soil is always made up twelve months before it is required, thus causing it to be in a mellow condition by the time it is used.

With regard to watering, it is the usual practice at Manchester to keep the thick-stemmed species of Cacti dry at the roots from October till the end of March or beginning of April. This treatment gives the plants a complete rest. If the weather proves mild and sunny in April, then the soil both in the beds and in the pots is given a thorough soaking with water that has a temperature considerably higher than that of the atmosphere of the house. This tepid water tends to stimulate root growth. After the first watering, it is customary to allow the soil to dry out—not, however, to become dust dry—each time before the next application of water is made. During the six weeks following, it is found that water given every ten days is quite sufficient, but later on most of the plants require watering once a week during the growing season. Rain water is preferred to tap water, but in Manchester even this is superior to the hard water so characteristic of many water-supplies in the south. Neither watering nor spraying is carried out during dull, sultry weather, as such a proceeding would prove most detrimental to the well-being of the majority of Cacti. On the contrary, in dry, bright weather, spraying has a most beneficial effect and should be practised during the growing season whenever possible. Epiphytal Cacti such as Phyllocactus, Rhipsalis, and Epiphyllum require a certain amount of water even in the depth of winter, but they also need a somewhat higher temperature to keep their roots active.

SCHUMANN'S CLASSIFICATION OF CACTI.

As I have already mentioned, we follow, as far as possible, SCHUMANN'S classification and nomenclature of Cacti in Manchester. I propose, therefore, to deal with our plants in the sequence adopted by that botanist. I pointed out that SCHUMANN recognized three tribes. These are: (1) Pereskioideae; (2) Opuntioideae; and (3) Cereoideae.

Sub-Family I.—Pereskioideae.

Pereskia.—To those familiar with BENTHAM and HOOKER'S arrangement of Cactaceae it is certain to appear somewhat strange to start off with Pereskia, which is the thirteenth and last genus of Cacti described by these authors in their "Genera Plantarum." SCHUMANN, however, justifies this sequence on the grounds that he considers Pereskia to be the oldest type of Cactus, the genus nearest to Portulaceae and therefore one of the earliest to break away from the ordinary form of a dicotyledonous tree. Apart from the characteristically cactaceous flowers and spines, the majority of the Pereskias might easily be



FIG. 96. LEFT TO RIGHT: CEREUS CANDELABRUM, C. LURNIUS, C. BENECKII (SMALL), PHOCEREUS SCHOTTII, C. BENECKII (LARGE), C. LURNIUS, ECHINOCACTUS ORNATUS

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FIG. 97 – OPUNTIA ENGELMANNII VAR. LITTORALIS
O. ROBUSTA IN BACKGROUND



FIG. 95. OPUNTIA MICRODASYS

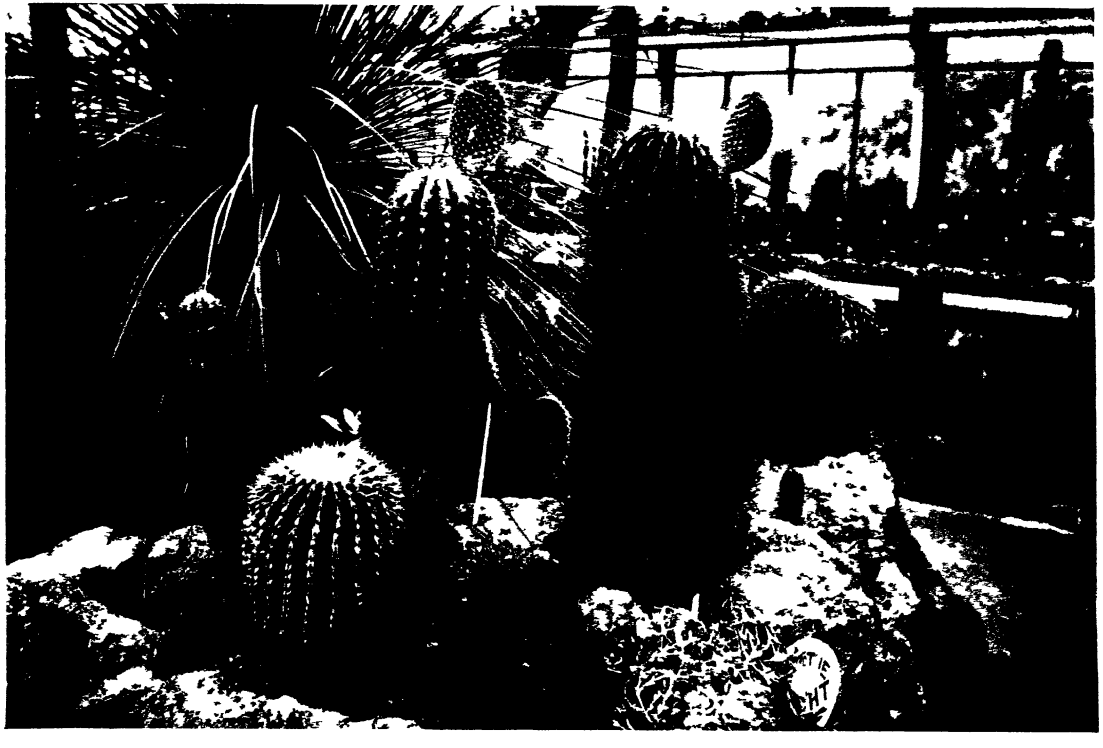


FIG 99.—LEFT TO RIGHT CEREUS CANDICANS LCHINOCACTUS GRUSONII CEREUS PASACANA LCHINOCACTUS RHODACANTHUS I PILOSUS L GRUSONII

To face p 309

mistaken for ordinary evergreen shrubs. Members of the genus are frequently used as stocks on which to graft Epiphyllums. We have five distinct species.

Sub-Family II.—Opuntioideae.

Opuntia is one of the best-known genera of Cactaceae and includes some 131 species. Its branches in numerous forms are so tough and spiny that they are employed in many warm countries as hedges. Over eighty species are included in the Manchester collection.

Nopalea is very nearly allied to Opuntia (to which it bears a very close resemblance). The Nopalea is well known in the south of Europe on account of a Mexican member of the genus being extensively cultivated as a food plant for the cochineal insect. We have all five members of this genus.

Sub-Family III.—Cereoideae.

Cereus.—Generally speaking, the members of the genus Cereus have columnar stems which grow to a good height, although several have climbing or creeping stems. Many of them produce most beautiful, but unfortunately very evanescent flowers, which often collapse a few hours after opening. *C. Macdonaldiae* has the reputation of bearing the largest flowers produced by any cultivated plant. The best known of all the Cereus is *C. grandiflorus*, 'The Queen of the Night.' This does remarkably well with us in Manchester.

Pilocereus differs from Cereus in that the flowers are shorter, more wax-like in structure and the plants are more hairy and even woolly. Of the thirty-two species described by SCHUMANN we possess seventeen.

Cephalocereus is a very distinct genus and is represented in most collections by *C. senilis*, the 'Old Man Cactus.' In Manchester, specimens of this species have to be washed every spring in order to get the hair cleared of the grime and dirt with which it becomes enveloped each winter.

Echinopsis is in many ways very similar to Echinocactus. The members of the genus Echinopsis can be distinguished, however, from the former when in flower as their blooms are produced on the side of the stem, those of Echinocactus being borne on the apex of the stem. The genus Echinopsis is represented by seventeen species in our collection.

Echinocereus.—The majority of the species included under Echinocereus are dwarf and spreading with rather softer tissue than that which is typical of most of the members of Cactaceae. The majority of the cultivated species are represented in the Manchester collection.

Echinocactus.—The 'Hedgehog Cactus'—Echinocactus—has stems which are all more or less of a globose character and covered, usually, with extra strong spines. *E. Grusonii*—the 'Golden Cactus'—is one of the best-known members of the family and, withal, one of the most easily grown. During the whole thirty years in which Cacti have been cultivated in our Manchester parks we have never known

a single specimen of *E. Grusonii* to die. The genus is a very large one—138 species—of which number we cultivate about sixty-six.

Leuchtenbergia is a monotypic genus whose flowers are not unlike those of some species of Cereus. They are produced near the apices of the partly developed tubercles.

Phyllocactus was one of the first of the Cacti to be grown in this country. One species—*P. Phyllanthus*—was cultivated as far back as 1710. The flowers of the Phyllocactus are of a brilliant colour ranging in different species from bright crimson to pure white. Among the latter there is, perhaps, no more desirable species than one we grow under the name of *P. Thomasianus*.

Epiphyllum.—Known as the 'Lobster-Claw Cactus,' this was at one time a most popular stove shrub and, being easily grown, is still a favourite with some amateurs. We find that the soil best suited for the cultivation of both Epiphyllum and the Phyllocacti requires much more humus in its composition than does that provided for the majority of terrestrial Cacti. Well-rotted manure and a small proportion of leaf-mould are used for the purpose.

Rhipsalis.—As the fruits of several species resemble those of the Mistletoe, Rhipsalis is sometimes called the 'Mistletoe Cactus.' It is a somewhat remarkable genus on account of the various forms assumed by a number of the different species.

Peat, fibrous loam, and sphagnum moss in equal parts, to which a small quantity of lump charcoal is added, is the compost in which our Rhipsalis are grown. The last three genera, being epiphytal, are more or less spineless.

Mamillaria.—BENTHAM and HOOKER estimated that there were some three hundred different species of Mamillaria known to science, but so far as I can gather, SCHUMANN only mentions ninety-nine in his monograph. Generally speaking, the genus can be more or less easily identified by the presence of the characteristic tubercles and the radiating spines.

M. plumosa—the 'Feather Ball'—is perhaps the most popular member of the whole genus.

Pelecyphora.—This genus is known as the 'Hatchet Cactus' and is closely allied to the Mamillaria. It differs from the latter, however, in the shape of the tubercles which are more or less flattened. We find the species rather difficult to grow, and to attain anything like success with them they require the protection of a bell glass all the year round.

Ariocarpus.—Our collection contains three species of Ariocarpus, which were formerly regarded as Mamillarias. They are called the 'Living Rock Cactus,' and few, if any plants are capable of withstanding drought for such a lengthened period as they.

A FEW SUCCULENTS OTHER THAN CACTI.

Space permits me to say but little regarding any other of the succulents usually grown in association with Cacti.

One might easily write an equally long paper in dealing with even a very limited number of these genera. I feel, however, that in view of the title of my present paper, I ought to mention at least one or two of the representatives of this group.

Mesembryanthemum.—Unlike the great majority of the Cacti, which are confined to the Western Hemisphere, the members of this family are nearly all natives of Africa. Dr. N. E. BROWN, who has paid great attention to this group of plants, has recently published a new classification and nomenclature. So far we have not been able to adopt this in the arrangement of our collection and we still adhere to the name Mesembryanthemum, under which we list nearly one hundred distinct species.

Cotyledon.—Members of this genus have in the past proved most popular garden plants and were largely used for adding character in formal bedding arrangements. Many of the large-leaved species make most useful and ornamental greenhouse plants.

Stapelia.—An interesting genus of South African plants with stems very similar to those of many of the Cacti. They are noted for their peculiar star-fish-like flowers, and the carrion-like odour they emit in order to attract flies to bring about pollination.

Euphorbia.—A widely distributed genus, but the succulent forms of it, which only concern us here, are largely confined to the arid regions of South Africa. These closely resemble many of the Cacti but are easily distinguished from them by their spines, when present. Like the former, they become succulent in order to store up the necessary moisture to enable them to live through the long droughts to which they are subjected.

Aloe.—The Aloe is the African counterpart of the Agave, whose native habitat is America. The Aloe is a Liliaceous plant whereas the Agave belongs to the Natural Order Amaryllidaceae. *Aloe variegata* is a favourite greenhouse plant. Its peculiar foliage-markings have given rise to its common name ' Partridge-breast Aloe.'

A PRELIMINARY NOTE ON THE TARNISHED PLANT BUG (*LYGUS PRATENSIS* LINN.).

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DURING the autumn of 1930 the agricultural authorities of West Sussex invited the co-operation of the writer on account of severe damage caused by capsids to Chrysanthemums in the Worthing area.

Visits were subsequently made to the area concerned and inspection of several nurseries, where damage had been reported, was undertaken, in the course of which it was found that of the capsid bugs occurring in glasshouse conditions the Tarnished Plant Bug (*Lygus pratensis* Linn.) was more common than any other. Since that time research has been made on the Bionomics and Control of this pest, both at Worthing and Wye, especially with reference to its occurrence under glass.

The present paper is not intended to be an exhaustive account of the pest, but rather to be a preliminary contribution to further research now in progress.

Facilities and arrangements for the inspection of nurseries in the Worthing area were made by Mr. F. W. COSTIN (Horticultural Superintendent for West Sussex), to whom the writer is greatly indebted.

I. BIONOMICS.

Although this capsid, varietal forms of which exist, is probably the most common and widely-distributed of our indigenous species, its complete life-history in this country has not, as far as the writer is aware, been recorded in detail in any one paper. Historically, the bug has not been neglected, for DOUGLAS and SCOTT (1863), SAUNDERS (1892), and BUTLER (1923), describe the adult in full, and CURTIS (1857), ORMEROD (1881), and WHITEHEAD (1885), doubtless refer to this insect, although its nomenclature differs. The *Lygus umbellatarum* recorded by WHITEHEAD is probably *pratensis*; THEOBALD (1905) also considered CURTIS' *solani* to be the same. The *Lygus umbellatarum* figured by CURTIS (*loc. cit.*, fig. 27, p. 434) may also be *pratensis*.

(*a*) *The Adult.*

The description of the adult by SAUNDERS (*loc. cit.*) is as follows:

"L. pratensis, Fab. (var. campestris, Fab.).—A most variable species, usually testaceous, more or less marked with darker colour; some specimens, however, are black, others almost entirely pale green, others again reddish brown, with darker markings. It varies also much in puncturation and brilliancy of surface. The characters by

which it may be known from its congeners are, the comparatively short antennæ compared with any of the preceding species, which do not reach beyond the apex of the clavus ; its much larger size compared with any of the species of the *Orthops* group ; the very fine short spines of the tibiæ, and the two dark rings at the apex of the posterior femora.

" L. 5–6½ mm.

" The race or variety *pratensis* has the elytra much more sparsely punctured and the punctures larger, and is generally a more convex and more brightly coloured insect ; *campestris* has the elytra very closely punctured, and is generally dull brown or greenish. Both forms are common and generally distributed."

The adult (fig. 100) is popularly termed in some districts the " Bishop Fly."

(*b*) *The Immature Stages.*

CROSBY and LEONARD (1914), in America, give full technical descriptions of these nymphal stages, of which there are five.

As these will be more fully described in a future paper, it is sufficient here to indicate that they are usually fairly easily separated from the nymphal or young stages of other glasshouse capsids. They are robust and vary from pea-green to mottled-brown in colour, and are characterized by the presence of a pair of black spots on the first and second thoracic segments in the later stages at least.

There is often some variation in coloration of the later stages (fig. 101), especially IV and V ; this is mainly associated with the wing-pads.

After the final moult the adult is usually of a very pale colour, the whole insect having a pinkish flush extending from the thoracic region, the head being pale greenish. The membraneous apices of the wings are slightly darkened. Segments 1, 2, and 3 of the antennæ and the legs are pale to transparent ; segment 4 being much darker, inclined to black. Femoral bands distinct, orange. Within 24 hours the insect becomes appreciably darker, especially the mid-region of the wings, the thorax, legs, and antennæ.

There is some evidence that two generations occur in a year, as in certain parts of America. THEOBALD (1905) and others suggest this, and existing records of both vernal and autumnal egg-laying lend support to this theory. Moreover, two distinct periods of attack by this insect on certain plants, including Chrysanthemums, as mentioned later, also support it. Investigation on this point is in progress.

(*c*) *Hibernation.*

Over-wintering of this capsid in the adult stage is commonly accepted as being the more normal method, but THEOBALD (1905) suggests that over-wintering also takes place in the egg stage, and MILES (1928) records this also. During the present investigation the writer has found that only adults have hibernated in the area

concerned, but the possibility of the over-wintering of this capsid in the egg stage in some instances is not entirely dismissed.*

Hibernation of adults occurs in various places, sheltered rubbish-heaps, refuse within and around glasshouses, and similar situations being most commonly favoured. Where *L. pratensis* occurs on natural herbage hibernating adults are somewhat difficult to find. MILES (*loc. cit.*) has definitely recorded the over-wintering of the *ova*, whilst SMITH (1931) mentions the hibernation of adults at the base of grass-tufts and under leaves.

Mortality is very high among the hibernating adults, and consequently only a small percentage remain to emerge in the spring.

(*d*) *The Pre-Oviposition Period.*

In no instance has the writer found eggs in any stage of development in dissected females during the early part of winter, and adults kept in the Insectary and Laboratory did not pair until late January. *Ova* have not been found, in these conditions, in dissected females, until late February. By mid-March eggs were almost ready to be laid.

In the field it is not uncommon to find females full of ripe *ova* during late April and May.

(*e*) *Oviposition.*

COLLINGE (1912) brought forward evidence of the occurrence of the spring oviposition of *L. pratensis* within the tissues of Apple fruitlets; THEOBALD (1905) records eggs as being found during May, and the present writer (1931) mentions egg-laying as taking place during mid-April in the flower-buds and flower-stalks of *Senecio vulgaris* (Groundsel). In America, TAYLOR (1908) and CHITTENDEN and MARSH (1910) also record the spring oviposition of *L. pratensis*. LINTNER (1898) mentions this also.

In this country, FOX-WILSON (1925) records autumnal (August–September) oviposition in the flowers of Dahlias; egg-laying has also been observed during the autumn in America.

(*f*) *The Egg* (fig. 102).

This has been described by FOX-WILSON (*loc. cit.*) and TAYLOR (*loc. cit.*), and also by the writer (*loc. cit.*), the measurements as recorded in these references being as follows:

	Fox-Wilson.	*Taylor.*	*Austin.*
Length . .	1 mm.	0·782 mm.	0·85 mm.
Greatest width .	0·24 mm.	0·241 mm.	0·32 mm.

These measurements are based on the average of a number of eggs in each instance, the eggs in all cases being dissected from plant tissue. FOX-WILSON (*loc. cit.*) mentions that the length and diameter varies. The pressure exerted during mounting for the purpose of microscopic

* Since this account was written two newly-hatched capsids (? sp.) have been found (Jan. 23, 1932) on Chrysanthemums in the College glasshouses at Wye.

examination, and also the effect of the tissues in which the eggs are deposited, may reasonably be held to account for some variation.

The *ovum* is of the characteristic shape commonly found in the Capsidae, being curved along its length with the distal end bluntly rounded and thick. One side is distinctly convex and the other slightly concave.

The " rim " is very marked, and beneath this the " neck " narrows; it is here that the narrowest portion of the *ovum* is situated.

The body of the *ovum* is creamy-white in colour, the " cap " appearing to have a greenish tinge.

The chitin is firm and elastic, and superficially presents a reticulated appearance.

(*g*) *Distribution, and Associated Species.*

This insect is very common in this country, and apparently so in Canada and U.S.A. It occurs in many other countries, including Bermuda, Finland, Norway, Sweden, Russia, and Mexico.

In the conditions usually found in and around the nurseries inspected during the course of the present investigation, certain other species of capsids were often in evidence upon Chrysanthemums.

These included the Common Green Capsid (*Lygus pabulinus* L.) and *Calocoris norvegicus* Gmel. These two insects were found to be causing damage to Chrysanthemums similar to that caused by *L. pratensis*, but they were never present in any appreciable numbers.

In this connexion it is of interest to record the persistence of several adult *L. pabulinus* within glasshouses at Wye until mid-November 1931 and, in the case of one adult, until December 15.

II. Host-Plants.

The Tarnished Plant Bug is a cosmopolitan insect, and has a very extensive range of plants upon which it is able to exist during certain periods of the year. Early in the spring it may be found upon certain plants, including groundsel, and also upon various fruit-bushes such as Currant. Later on, it is often quite common on fruit trees, and towards the end of the summer nearly all hedge-bottom flora has its complement of this bug. Observations have shown that it quite readily leaves one type of plant for another; definite migrations have been seen to take place from Currant to Potato, and thence to Chrysanthemum.

The following are numbered among its host-plants in this country: Apple, Aster, Beet, Blackberry, " Brotex," Chrysanthemum, Currant, Dahlia, Hop, Pear, Plum, Poppy, Potato, Red Clover, and Strawberry. Mr. F. J. Chittenden, of the Royal Horticultural Society, has informed the writer that the insect under review is also known to occur upon Broad Beans and *Erigeron canadensis* in this country. Hey (1932) lists Sainfoin as a host-plant of this bug also. Many weeds, including Dock, Fleabane, Groundsel, and Nettle, are also host-plants of this capsid. The above list could be somewhat amplified, but is sufficient to show the varied nature of the food-plants of this pest, and also gives an indication of potential sources of infestation.

Apricots, Barley, Broad Beans, Cabbage, Carnations, Celery, Cherry, Cucumber, Gooseberry, Grapes, Kale, Mulberry, Mullein, Oats, Peaches, Quince, Sweet Pea, Turnips, and Wheat, to mention only a few, are host-plants of this pest in other countries.

III. Extent and Nature of Damage.

Although this pest is apparently one of major importance abroad, especially in the United States of America, where its depredations on Peach nurseries are of serious proportions, its occurrence in this country is seldom a cause for alarm in out-door conditions on the majority of crops. For instance, *L. pratensis* is often very prevalent in orchards and plantations in this country; in fact, in many parts of South-Eastern England, the majority of Apple trees and Currant bushes give shelter to this bug, yet fail to show any signs of serious injury due to its feeding. Nevertheless, one outstanding record of its economic importance to Apple was mentioned by Collinge (*loc. cit.*), who found *ova* laid within the tissues of developing fruitlets; and Theobald (1905) records this insect as causing foliage damage to Apple, Pear, and Plum. However, its importance in fruit-cultivation has been dismissed by Fryer (1914) and others, and it may reasonably be asserted that the Tarnished Plant Bug is only of economic importance in this country in connexion with floriculture.* Serious attacks by this insect on other crops do occur, but are usually of only local importance. With the floricultural industry we find that the bug is of widespread importance and, moreover, is a persistent pest which definitely appears year after year in certain nurseries.

The damage caused by this insect to certain plants cultivated for cut blooms is often very serious, and of the plants attacked Chrysanthemums and Dahlias appear to suffer most. Asters are also attacked. Abroad, on the Continent and in the U.S.A., similar attacks by certain capsids occur.

For the purpose of this paper, only damage to Chrysanthemums will be referred to in detail.

Theobald (1901 and 1903), Miles (*loc. cit.*), Fox-Wilson (*loc. cit.*), and others, record damage by *L. pratensis* similar to some of the types described below.

Observations have shown that there are two distinct periods when attacks mainly occur in the Worthing and Wye areas: the first in the spring, when the damage is not often serious, and the second in the late summer and autumn, when the Chrysanthemum plants are brought into the glasshouses; during the latter period serious damage is frequently caused. The immature bugs, and also adults, are to be found within the glasshouses at this time, and many immature bugs are often present during November and even later. Speyer (1929)

* Recent American records show that this insect is also the cause of serious injury to the buds, blossoms, fruits, and growing tips of apple and pear, as well as peach.

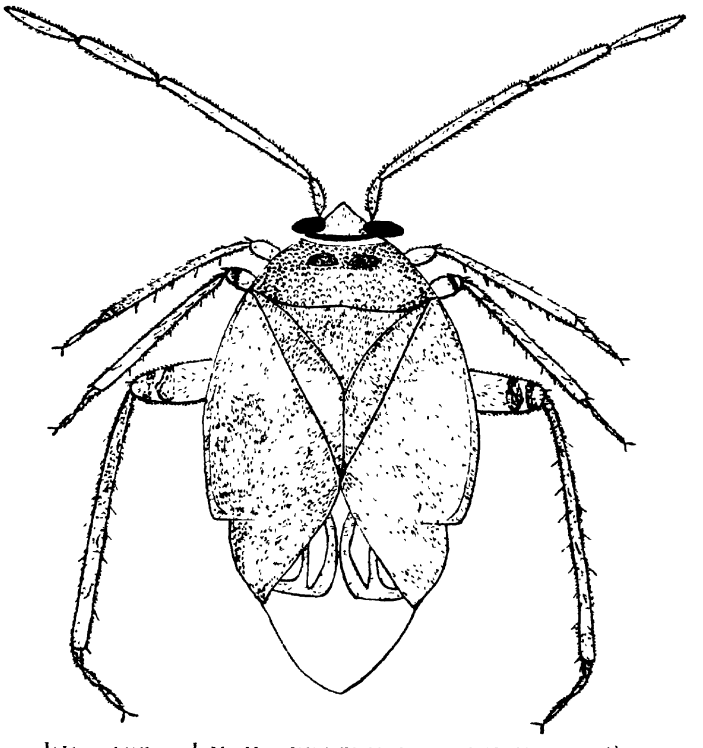


Fig. 100.—Lygus pratensis, adult. × 8.



Fig. 101.—Later Immature Stage of Lygus pratensis.

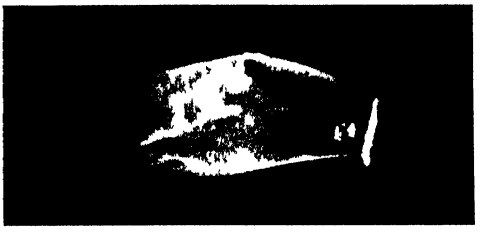


FIG. 102. EGG OF LYGUS KRATTNSIS. × 40



FIG. 103. CHRYSANTHEMUM STEM DAMAGED BY LYGUS KRATTNSIS (p. 317)

[*To face p.* 317

recorded attacks of this bug on Chrysanthemums during July; and STANILAND (1926) mentions damage by this bug to the same plant as occurring during January in the Cheltenham district. Injury to fruit trees in the spring period has been noted in America.

Several types of damage may occur on Chrysanthemums. The most noticeable is that caused by the immature bugs, and sometimes the adults, feeding near the tips of the shoots. The ultimate result of the feeding-punctures is stunting and malformation of the shoot, occasionally followed by off-shoots appearing. The attacked area is scarred and often somewhat cracked (fig. 103). Another type is stem-injury, which weakens the plants, and here again the formation of scarred areas, darkened and calloused, takes place.

Injury to the flower itself also occurs, the base of the flower (fig. 104) frequently being punctured in the bud stage and resulting in a distorted bloom. "Blindness" of the plants, often attributed to other causes, may be expected to result from such attacks. Opened blossoms are not immune from the ravages of this pest, individual petals also being punctured so heavily that the blossom suffers and is discoloured. The primary punctures caused by capsids to the petals of one such bloom are shown in fig. 105.

Although *L. pratensis* is mainly responsible for the damage referred to above, it has been observed that *L. pabulinus* and *Calocoris norvegicus* are equally capable of causing it. PAPE (1931), in Germany, records *L. pabulinus* as feeding on Chrysanthemum flowers, and mentions that the attack on the petals causes spots which render the blooms unsaleable.

Foliage damage, although occurring, has not been observed to reach any serious extent in the area investigated, although, on certain individual plants, severe injury to the foliage has been seen.

In the nurseries visited, it was estimated that the Tarnished Plant Bug was responsible for the damage, in some form or another, to at least twenty per cent. of the plants in some centres, especially during the autumn of 1930.

The damage is not always readily noticeable, and not until the blooms are picked is it realized that the extent of such damage is serious. This is due to the fact that the growth of the plant obscures the markings on the flowering stem.

IV. CONTROL.

Any initiation of control measures should obviously be primarily concerned with the removal or destruction of outside sources of infestations, such as Currant and Gooseberry bushes in a state of neglect, cleaning-up of hedge-bottoms where the bugs may hibernate, destruction of weeds on which the capsids are capable of existing, together with the clearing-up of any material (refuse, etc.) within the flower-beds and glasshouses where Chrysanthemums, Dahlias, and other flowering plants are being cultivated.

Where infestations occur, the use of insecticides such as nicotine sprays and dusts will doubtless be of benefit; but it is imperative that spraying operations should be carried out with a view to actually "hitting" the insects with these materials, which are designed to kill by actual contact. It is generally accepted that to secure maximum efficacy a thorough drenching of plants and insects is necessary; the use of a coarse nozzle for the application of washes involving the use of nicotine is therefore stressed.

However, even where spraying or dusting is carried out in an efficient manner, in the presence of uncontrolled sources of infestations, such as are mentioned above, reinfestations will occur, which may nullify attempts at permanent control.

Miss ORMEROD (1881) advocated destruction of rubbish in which hibernation may take place, and WHITEHEAD (1885) also suggests this, as well as "jarring" the insects on to some sort of sticky substance.

THEOBALD (1901) mentions the "jarring" method, and suggests that it should be done over tarred boards, and he also recommended a Paraffin-Soap Emulsion as well as the destruction of hibernating adults. Again (1905), he mentions "jarring" over boards or sacks and lays emphasis on the destruction of dead stalks, rubbish, etc., and he records that some attacks were traced to grassy areas near at hand.

MILES (*loc. cit.*), referring to this bug on Chrysanthemums, records the use of nicotine and soft soap and also fumigation methods, and SPEYER (1929) found that dusting with Flowers of Sulphur had a considerable effect in keeping the insects from feeding on the foliage and stems of Chrysanthemums.

Amongst the materials used abroad are certain insecticides, including Kerosene Emulsion, Nicotine sprays, Sulphur dust, and Pyrethrum, as well as attempts at mechanical control by means of sticky shields, suction apparatus, and baits. The majority of these met with indifferent success, but it should be borne in mind that in most instances the materials were tried out on various plants and trees not comparable to Chrysanthemums, with the protection of which we are more particularly concerned in this paper.

The vast amount of time spent in cultural operations of one kind or another on Chrysanthemums in particular gives opportunity for killing the bugs by hand-picking. By this method at least one centre is known to be kept tolerably free from serious injury by the Tarnished Plant Bug during the disbudding season.

Discrimination should be used when attacks are occurring on *open* flowers, to avoid any injury by the insecticides or fumigants.

V. DISEASE TRANSMISSION.

The rôle of *L. pratensis* as a definite vector in the transmission of virus diseases has not been established in this country. SMITH (1927) recorded certain observations on the insect carriers of Mosaic disease of the Potato, and indicated that *Lygus pabulinus* and *Calocoris bipuncta-*

tus (*norvegicus*) failed entirely to transmit the disease. And later (1931), when mentioning certain capsid bugs (including *L. pratensis*), SMITH states: "Although these insects have persistently failed, in the writer's experiments, to transmit potato viruses, yet in the present state of knowledge of this difficult subject it is not wise to state dogmatically that these species can never under any circumstances act as vectors of potato viruses."

In America, CROSBY and LEONARD (*loc. cit.*) record that the Tarnished Plant Bug causes injury to Apple, Pear, and Quince, especially nursery stock, by carrying the fire-blight bacteria to healthy trees. GOSS (1930), investigating the rôle of certain insects in connexion with virus diseases, records that both "spindle tuber" and "unmottled curly dwarf" can be carried by this bug, but that "Leaf-roll," "rugose mosaic," and "mild mosaic" were not carried by *L. pratensis* under the conditions of his experiments. However, ELZE (1927), in Holland, records that the "Leaf-roll" of Potato is spread by *L. pratensis*. KUNKEL (1926) brought forward evidence that this insect is unable to transmit "Aster Yellows."

There are many other records of suspected cases of disease-transmission by this bug in other countries, as well as in the U.S.A.

VI. NATURAL ENEMIES.

During the present investigation, but one natural enemy of *Lygus pratensis* has been observed, namely, the predaceous bug *Anthocoris nemorum* L. This has been frequently observed attacking the immature stages, and even adults, of *L. pratensis*, especially during October and November, where both insects occurred plentifully on Chrysanthemums under glass.

The immature stages of this predatory insect are comparatively voracious feeders and attack *L. pratensis* more readily when the capsid is undergoing a moult. At that period the capsid is practically defenceless and almost wholly immobile, and thus falls an easy prey to its enemy. The adult Anthocorids do not appear to attack the capsids with as much readiness as do the nymphs.

THEOBALD (1926) mentions this Anthocorid as being an Aphid predator, and MASSEE and STERR (1929) record it as being predaceous on the eggs of the Fruit-Tree Red Spider.

Anthocoris nemorum, in its adult state, is about one-sixth of an inch in length and is predominantly black. The head and thorax are very deep black; the wings are black in the mid-region and white at the base, and also whitish at the membranous apices. The large compound eyes are black, and the ocelli, which are situated immediately behind, and almost touching on, the inner posterior angle of the compound eyes, are reddish-brown. The antennæ, which are composed of four joints, are black. The legs are brownish, excepting the basal portion, which is darker. The proboscis is very dark.

The nymphs, or immature stages, are devoid of wings; but in the

later stages wing-buds develop. They are reddish-brown in colour, and are very active.

As far as the writer is aware, no other natural enemies of *L. pratensis* have been recorded in this country.

Abroad, at least two Hymenopterous parasites of the eggs of the Tarnished Plant Bug are known, namely, *Anagrus ovijentatus*, recorded by CROSBY and LEONARD (1914), and *Polyenema pratensiphaga*, mentioned by WALLEY (1930). PAINTER (1931) also records the occurrence of a Mermithid parasite (Genus *Hexamermis*) in the Tarnished Plant Bug ; the nematode was found coiled about the intestinal tract and in a few cases extended into the thorax, the result of this parasitism being the sterilization of the host. This parasite would appear to occur only in low-lying land that is more or less wet.

A predaceous Reduviid, *Sinea diadema* F., is recorded by READIO (1924) as feeding on *L. pratensis*.

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FIG. 104 CHRYSANTHEMUM DAMAGED BY LYGUS PRATENSIS
(p 317)

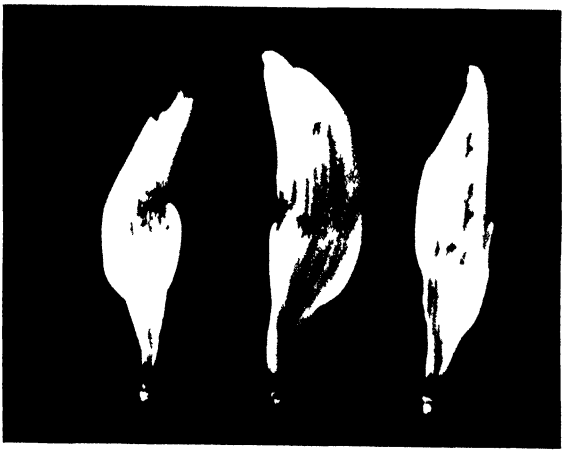


FIG. 105 CHRYSANTHEMUM PETALS DAMAGED BY LYGUS PRATENSIS
(p 317)

[*To face p* 320



FIG 106.—SEDUM SPECTABILE IN EARLY SEPTEMBER

A full daylight ripening fruits B 12 hrs daylight 5 hrs electric light ripening fruits C 12 hrs daylight leaves dropping no flowers D 0 hrs daylight no flowers

CONTRIBUTIONS FROM THE WISLEY LABORATORY.

LXII.—Response of Some Common Garden Plants to the Daily Period of Light.

By M. A. H. Tincker, M.A., D.Sc.

In our gardens we are accustomed to notice the seasonal changes of our plants; usually we can predict with fair accuracy the time at which any species will flower. Each species or variety develops at its own pace, and year in year out there is, generally speaking, little relative rearrangement in the floral calendar. The exceptions attract more attention than do the large number of followers of this general rule. Should one species, or variety, prove early or late, its behaviour does not escape the gardener's comments, and explanations are frequently attempted. The vagaries of our climate are held responsible for much; but without making careful tests or practical inquiries it is not wise to hold any particular factor, such as temperature or rainfall, responsible for the observed irregularity.

Considering the general followers of the seasonal calendar, we may inquire if there is any factor that governs their behaviour. As the season advances from January to (nearly) July the days lengthen; this factor, "length of day," unlike some other climatic factors, is of regular yearly behaviour. In recent years it has been established that the length of the daily period of light greatly affects the growth of plants, and more recently has it been shown that birds and animals too respond to the same influence.

With plants, this was accomplished by growing the species to be tested under controlled periods of (natural and natural + artificial) light, and details of the method have already been described in this Journal (vol. **54**, p. 354). The method consists of placing the plants in the light for a given number of hours each day, and when the plants are in darkness preventing large differences of temperature, or moisture of the air (such wide differences would interfere with the results). The plants must receive comparable amounts of water and similar supplies of nutrients from the soil.

Since the publication in 1929 of the previous report, some further experiments have been carried out at Wisley, and these conditions were again fulfilled. The only factor that was varied was the length of the period of light.

Weak electric light was employed to lengthen the natural light.

The following series of plants were grown in loam in suitable pots:

A Full daylight, controls.

B Received twelve hours daylight and five hours weak artificial light (of 2–4 c.p.*).

* Candle-power at soil level of pots.

C Received twelve hours daylight.
D Received six hours daylight.

The difference between B and C series was five hours of weak electric light. It will be shown that this light applied immediately after the daylight each day has a profound effect. A is a long period of light in summer, but in early spring and in the winter A is a shorter period than B.

The resemblance between the plants of the different series shows that the effect is caused by the *duration* of the light rather than by its intensity.

The results obtained will be considered for each species separately.

Sedum spectabile.—The plants to be used in the experiment were raised by vegetative division, so that as little variation as possible occurred. When the experiment started in February each plant consisted of a small rosette of four or five diminutive leaves wrapped around the growing point and barely visible above the level of the soil in the pots. These small plants were exposed to the different conditions of light for the first time on February 12. Two months later, in mid-April, large differences in growth were apparent. The stems of the plants receiving long periods of light had begun to elongate and were about 8 cms. (2½ inches) in height; those of the plants receiving short periods were as yet invisible above the soil. The small rosettes of the former, A and B series, were also more lax than those of the series C and D, which received short periods of light daily. These differences became even more obvious as the summer approached, so that in early June the plants of A and B series were tall, measuring 20 cms. (about 8 inches); those of C and D measured only 8 cms. (or about 2½ inches), and were more compact rosettes. In early July the flower buds of the tall plants were opening. The smaller plants growing under the short periods of light produced no flowers, but plants remained in the vegetative stage of growth throughout the season. The leaves changed colour early in September, and fell from the plants of C series; well-formed new buds were then apparent at the soil level. The control plants and those receiving long periods of light, A and B, produced seed in the normal manner, and leaf fall took place at a later date; new basal buds were formed in the late autumn (fig. 106).

We see, therefore, that the whole seasonal cycle of stem elongation, flower production, and seed development was entirely omitted when the period of light was short; it seems a reasonable conclusion to draw from these observations that in the garden the seasonal change is due to the length of the days.

In subsequent years the plants appeared healthy and vigorous, although they had not flowered. GARNER and ALLARD * report that they have maintained this species in the vegetative condition for as long as nine years by growing the plants under short daily periods of

* *Journ. of Agric. Res.*, vol. xliii, No. 5, p. 439. 1931.

light. Even after this time, when the plants were transferred to long daily periods of light, flowering took place in a normal manner, and no delay in the process was shown by the experimental plants when compared with control plants that had experienced the full length of the summer days in the latitude of Washington from year to year.

Briefly, this herbaceous plant can be maintained in a flowerless condition by manipulation of the length of the day, a short period of light causing vegetative growth.

Saxifraga decipiens var. bathoniensis.—Plants of this species were first subjected to the different periods of light in early February. In mid-April the control plants and those of B series bore a large number of flowers; the height of the flower stems was normal, *i.e.* about 10 inches. The plants of B series receiving twelve hours daylight and five hours electric light produced flowers of a poorer colour, the petals were pale, the red pigment was not so well developed.

These two series of plants formed a marked contrast to those receiving only short periods of light, in which the whole process of floral development was greatly retarded. As the season progressed it became apparent that the short days had almost entirely suppressed the production of flowers; only a few short flower-stems were formed very late in the summer. The plants remained as close rosettes with a compact habit of growth, the leaves crowded on the stems at short intervals. The nodes of the plants subjected to the longer periods of light were farther apart on the stems, so that the plants did not have this dense, compact appearance. No seed was produced by the plants grown under the short periods of light (fig. 107).

This species gave somewhat similar results to those obtained with Sedum.

Anchusa italica var. 'Pride of Dover.'—The experimental plants were raised by making root cuttings. Growth started in the early days of March; it was soon noticed that the plants of the series B, receiving the additional electric light, were elongating more rapidly than those receiving the natural light A, or the short twelve-hour period of daylight C. However, as the days lengthened the control plants grew rapidly and came to resemble those receiving twelve hours daylight and five hours electric light. These plants, of A and B series, were much earlier than those of the C and D series subjected to the short periods of light. The latter flowered about seven weeks later than the former and never attained the full height of the others (fig. 108).

Differences were observed in the colour of the leaves—the plants subjected to twelve hours light each day were darker; the leaves had presumably more chlorophyll in the tissues than had similar leaves of plants growing under the long periods of light. No signs of etiolation were seen in the plants growing under such short periods as six hours.

Tulip 'William Pitt.'—The bulbs used in the tests were selected by size so as to obtain uniformity. They were not specially prepared bulbs. Previous to potting, the bulbs had been stored in an unheated

dry condition since lifting in late July. After potting in early December the bulbs grew slowly in the dark at the temperature of the outside air. In early February the shoots were visible above soil level, and inspection showed the roots to be fairly well developed. The experimental treatments then commenced. There were 100 plants in each series. In a month the plants that received the twelve hours daylight and six hours electric light, B, were growing most rapidly. Plants receiving only six hours light were growing very slowly, but were healthy. Unfortunately the control plants A exposed to the outdoor climatic conditions at night as well as by day showed signs of the "Fire" disease. At the end of April the plants of B series were bearing well-formed buds on stems of 12 cms. (5 inches); those of C series were not so advanced: their buds were smaller, and the stems shorter, measuring 9 cms. The plants of D series were even later still and the buds were barely visible in the enclosing leaves. The control plants A, more nearly resembling series B, were badly diseased and were discarded, for fear of infection of the others. In flower production it was apparent that the shortest period of light D, of six hours' duration, delayed the process by about two weeks, and such plants never attained the height of the others grown under twelve hours light or with the additional electric light (fig. 109).

In the tulip the young flower is formed long before planting time, so that in this experiment we were merely observing the rate of development of the flower-stems and the subsequent growth of the floral parts. Much of the food required for these processes is stored in the bulbs.

The experimental procedure influenced the rate at which this food was utilized, together with the water and salts taken up by the roots.

After the leaves had died down and the seasonal activity had ceased, the bulbs were lifted, cleaned, and weighed. The heaviest were those of B series—twelve hours daylight and six hours electric, 695 gms. per 100 (average weight); C series, twelve hours daylight, 650 gms. per 100 (average weight); D series, six hours daylight, 525 gms. per 100 (average weight).

The additional light of low intensity was of no value for the direct formation of food-substances by the leaves, and so did not directly account for the difference in weight seen between B and C series; it was no doubt *indirectly* responsible as the cause of a larger leaf surface in the (B) series of plants. More food would probably be formed by larger leaves.

Comparison with the diseased control plants was not made. However, the weight of the bulbs of B series compared favourably with the weight of bulbs grown in open ground (such plants were in flower a little later than the experimental plants of B series), but just comparisons with plants receiving full natural daylight are scarcely possible, as this involves comparing plants in the open ground with plants in pots.



FIG 107 —SAXIFRAGA DECIPIENS VAR BATHONIENSIS ON MAY 10
A full daylight B 12 hrs daylight 5 hrs electric light taller C 12 hrs daylight flowering later leaf rosettes denser
D 6 hrs daylight



FIG. 108 ANCHUSA ITALICA ON JUNE 3

A full daylight B 12 hrs daylight 5 hrs electric light C 12 hrs daylight, growing slowly, D 6 hrs daylight no lengthening of stem



FIG. 109. TULIP WILLIAM PITT GROWS MORE RAPIDLY WITH LONGER LIGHT

B, 12 hrs. daylight + 3 hrs. electric light. C, 12 hrs. daylight. D, 6 hrs. daylight.

To face p. 3-5

With the tulip the experimental data show that the period of light governed the rate at which the plant used the food-substances that had previously been made. Other observations upon the rate of utilization of the food-substances have been made with tuber-producing species and are mentioned in the article on that topic (p. 326).

The plants tested gave the same type of reaction—long periods of light caused blossoming and short periods of light caused vegetative growth. With other species the reverse holds true—long periods of light produce vegetative growth only, and short periods are necessary for flower production; of this, Cosmos and late varieties of Chrysanthemums are good examples. Varieties also of the same species may differ in their response to this factor, so that wide differences occur in the time of flowering under garden conditions.

The author desires to express his thanks to his colleagues at Wisley for the assistance they have given him in this experimental work, and to Mr. N. K. Gould for the photographs.

CONTRIBUTIONS FROM THE WISLEY LABORATORY.

LXIII.—The Influence of the Daily Period of Light and the Supply of Potassium on the Rate of Growth of Tubers and other Storage Organs.

By M. A. H. Tincker, M.A., D.Sc.

In vol. **54**, p. 354, of this Journal experiments were described which showed that flowering and fruiting can, to a very large extent, be controlled by altering the daily period of light under which plants are grown. These experiments also proved that the rate at which tubers and other storage organs developed in such plants as Artichokes and Dahlias was also influenced by the same factor. Briefly, long daily periods of light, either of natural daylight or of natural daylight supplemented by weak electric light, produced tall plants, whereas shorter periods of light caused a more rapid growth of the storage organs.

In the ensuing interval similar results have been reported from other countries: in U.S.S.R., under the climatic conditions of a Northern European summer, such plants of Mexican origin as *Solanum demissum*, *S. Bukasovii*, *S. acaule*, etc., grew in a generally satisfactory way, but produced no tubers. The reduction of the daily period of light to 10 hours caused tubers to be formed, but, when such experimental plants were again allowed long daily periods of light, the induced storage of food ceased.

In the collection of *Solanum* sps. made by the late Mr. Arthur Sutton, many grew quite well in our own latitudes, but a number failed to develop tubers; as yet no such experiments have been made with these species.

An interesting observation has been made by the Russian investigators, who found that one part of the plant may be made to produce tubers whilst the rest of the plant grows tall and produces no tubers: the effect can be localized in the plant.

Further investigations have been carried out at Wisley and a report * has been prepared for the scientific press; the present article deals briefly with the salient features of this work, more particularly from a horticultural point of view.

The experiments were designed to test the influence of the period of light upon the rate of growth of tubers, both in the presence and absence of a supply of the mineral nutrient—potassium.

* References to other original work mentioned in this article are given in the more detailed report. See *Annals of Botany*.

Four series of plants were grown, namely :

A Full daylight controls.
B Received 12 hours daylight and 5 (or 7) hours weak electric light.
C Received 12 hours daylight.
D Received 6 hours daylight.

Half (*i.e.* 12 plants) of each series received potassium, half received sodium. These plants were grown in sand to which the nutritive solutions were added. In addition, other plants grown in loam served as controls for this experiment.

The plants were grown in pots placed on trucks which were daily moved into the darkness at stated times, so curtailing the natural period of light.

Temperature.

The nightly shelter of series B, C, and D, caused an average increase of 1·9° F. in the minimum temperature over that of A during April, May, and June; in July and August the increase was 1·2° F. The electric light used for 5 (or 7) hours caused an increase of 0·7° F. Such small differences cannot account for the observed results, and, moreover, the observations show that plants of series A and B subjected to the greatest difference of temperature were alike, but they differed widely from plants of C series; yet the temperature conditions of B and C were almost equal.

Water : Nutrients.

All plants received a supply of water believed to be adequate. To compensate for rain that plants of A series only received, it was necessary at intervals to give more water to series B, C, and D.

With sand cultures the surface of the sand was protected from rain by thick paraffin-waxed paper tied around the edge of the pots and fastened around the stems of the plants. Very little water trickled down the stems to the sand. All watering was done by removing these covers and readjusting them. The use of these covers prevented rapid evaporation from the surface and the growth of Algæ.

Phaseolus multiflorus.

Sowing took place on May 14, 1929, and the subsequent seedlings were submitted to the different treatments from the commencement of their growth.

After eight weeks the controls A were tall, climbing plants, bearing well-formed flower buds. The plants of B series, which received the additional electric light, were "earlier," their flowers more numerous, and the young pods were quickly formed. The plants of C series were short and "bushy," without blossom. Such differences have previously been reported. The novel feature of the observations

concerned the development of the swollen roots of C and D series. Swelling of the roots took place in these plants, whether supplied with or deprived of potassium.

Chemical analysis showed that the concentration of the potassium in the plants of C and D series deprived of potassium was approximately a quarter of that found in plants supplied with it; despite this lack of potassium, accumulation of the food compounds in the roots took place. In the tall plants (of A and B series) the concentration of potassium in plants deprived of a ready supply of this element was reduced to one-sixth of the normal, yet no very readily noticeable effect upon the climbing and flowering habits or upon the rate of development of the seed in the pods was observed. Sodium was apparently a fairly satisfactory substitute for potassium in these respects.

DAHLIAS—'EPSOM STAR' AND 'GOLDPERLE.'

The experiment was repeated with two varieties of Dahlias raised from cuttings. Again the daily period of light controlled upward growth of the stems, the plants receiving long periods of light being taller than those receiving short periods. Deprivation of potassium produced a tendency of the leaves of both varieties to droop but not to wilt. As the season advanced, the observed differences in the rate of growth of the tubers, as judged by size, shape, and finally by weight, were due to the length of the periods of illumination. Both with and without potassium more dry matter (estimated by weighing the plants after drying) passed to the tubers of plants exposed for short periods (C series) than to the tubers of A and B series, receiving long periods of light. On the other hand, more dry matter accumulated in the stems of the plants of A and B series than in the stems of C and D series. Calculated on a basis of the dry weights, the lack of potassium had produced a concentration of only one-fifth of that found in plants supplied with the element.

The most striking differences between the series grown with and without potassium were shown by the total dry weights: the plants grown without potassium weighed considerably less. Sodium did not replace potassium in an entirely satisfactory way.

STACHYS TUBERIFERA.

A third series of experiments was made with the Chinese Artichoke, grown both from true seed and from small pieces of the tubers.

Again, the light treatment produced marked differences in growth and flower production. Control plants (A) and plants receiving 12 hours daylight and 5 hours electric light (B) flowered freely, plants subject to short periods of light (C and D series) did not flower.

Despite the fact that the sand in the pots was kept quite moist, the absence of potassium caused occasional wilting in the hot afternoons of July. No plant supplied with potassium wilted; all the plants

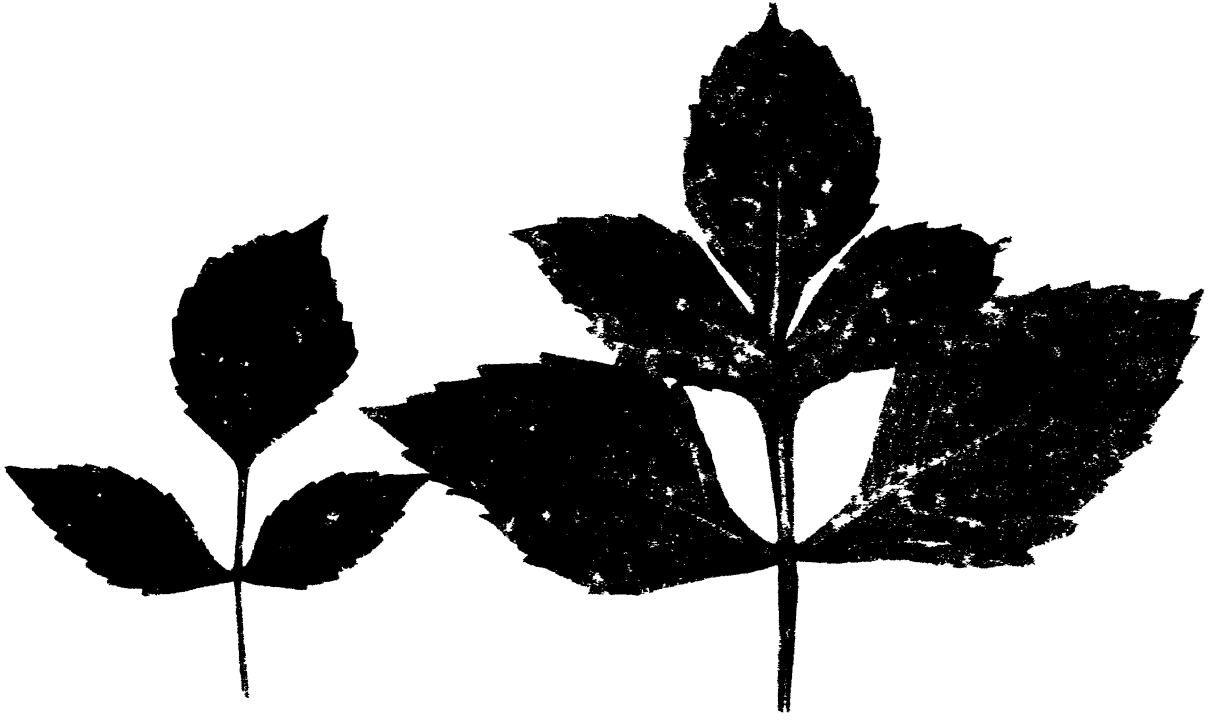


FIG. 110.—DAHLIA LEAVES ATTACKED BY ENTYLOMA DAHLIAE
First stage on left. Later stage on right.



FIG 111 LEAVES OF DAHLIA ATTACKED BY ENTYLOMA DAHLIAE
Left under right upper surface

deprived of potassium and exposed to the sun for 10 hours wilted. After nightly shade these plants recovered.

Plants subjected to 10 hours daylight (C series), both raised from seed and tubers and grown in sand and loam, produced a few creeping branches devoid of expanded foliage leaves. These surface " runners " were unlike the underground stems in that they did not swell up and store food. They were absent from plants of A and B series.

When lifted, late in the season, a higher proportion of the total dry weight was found in the tubers of C series than in A and B series, but the percentage of the total dry weight contributed by the tubers was less in the case of plants deprived of potassium than in plants supplied with this element.

In the plants deprived of potassium and subjected to short periods of light, which caused rapid growth of the tubers, very little potassium was found in the stems; it appeared probable that the stems had given up their meagre supply of this element to the developing tubers.

General Discussion of Results.

The three experiments emphasized the importance of the period of light: generally more rapid upward growth of the stems was accompanied by a decreased rate of food-storage, and vice versa. Long periods of light, both of natural daylight and daylight supplemented by weak electric light, favoured upward growth, shorter periods of 12 or 10 hours favoured an increased rate of food-storage in tubers. The period of light exercised a controlling influence upon the use of the food-products.

Translocation of Food-Substances to Tubers and Roots.

All the data obtained from different species in different seasons were " pooled." The total dry weights of the underground stems and roots were expressed in terms of the control (100) thus:

(A) Control = 100.
(B) 12 hours daylight + electric = 60.
(C) (12 or) 10 hours daylight = 130.
(D) (5 or) 6 hours daylight = 22.

This shows that more dry matter accumulated in the roots of C and less in B and D in the given seasons of growth.

For each light-treatment separately a comparison of the added weights of root and tuber, made from the point of view of nutrients, gave the following figures (in terms of " with potassium " = 100).

	With Potassium.	With Sodium.
(A)	100	100·9
(B)	100	108·4
(C)	100	83·4
(D)	100	99·2

That is to say that, where the tubers and roots developed rapidly under C treatment, less dry matter passed to the roots when potassium was replaced by sodium.

The total dry weights of all plants receiving potassium was greater than that of plants grown with sodium in the ratio of 100 : 84.

The dry weights of the leaves indicated that very little difference in foliar development had been caused by replacing potassium with sodium.

Whilst the light-treatments were primarily responsible for the proportional distribution of the dry weight, the nutrient conditions affected the quantity of dry matter formed. It may be that the difference of the *total dry* weights observed was primarily due to the influence of potassium upon the manufacture of the carbon compounds, particularly when one considers that a smaller difference in dry weight was found when the period of synthesis was shortened by curtailing the light. If less dry matter is produced when potassium is scarce it is not surprising that less dry matter passes to the roots and tubers.

Potassium Economy.

In all the plants, as the weight of the tubers increased during their development, potassium accumulated in the storage organs. By growing plants without an adequate supply of potassium various dilutions resulted ; but in plants deprived of potassium, when movement of the food-substances to the roots and tubers was accelerated by the conditions of light, the stems gave up their supply of potassium to the roots and tubers.

With both starch- and inulin-producing plants (beans and Dahlias) wide variation occurred in the ratio of the dry matter to the potassium present in the plant ; it seems unlikely that a definite weight relationship exists between the potassium and the chemical substances transported from leaf and stem to the roots.

The carbohydrates are moved as sugars, and stored as starch and inulin ; so that the transport may be preceded by the change of starch to sugar and succeeded by a change of sugar to starch. Such processes are facilitated by ferments or enzymes, as, loosely speaking, lubricating oil facilitates mechanical change. A familiar example of enzymes are those secreted by the salivary glands of the mouth ; these enzymes in a water solution accelerate the formation of sugar from starch. This may be demonstrated by the prolonged mastication of a grain of wheat, when it acquires a sweeter taste.

Enzyme activity can be influenced by the presence of various salts, and it would appear that potassium can influence the activity of certain enzymes operating upon sugars and starches. It has been stated by some investigators that deficiency of potassium actually increased the activity of a particular enzyme. Whether this be substantiated or not, it appears undoubtedly true that potassium affects the efficiency of the leaves in manufacturing the carbohydrates, as all the experimental evidence available indicates.

As far as transport itself is concerned, the data of the experiments show that a high concentration of potassium is not required if sodium is present. Probably some of the potassium present in the plant is

free to circulate from organ to organ, so that any given unit might be used more than once.

Familiar examples of plant proteins are found in the sticky gluten compounds easily observed by making flour into dough with a little water. These compounds contain nitrogen. Other investigators have observed a high proportion of the simpler compounds of nitrogen, such as nitrites, in the tissues of plants grown without potassium. Normally, such compounds would be further elaborated into proteins. The indications are that potassium is also associated with the building-up of protein compounds in the plants.

It is, therefore, not surprising that an element so closely linked with two such important series of reactions as the elaboration of carbohydrates and proteins, should also show its effect upon the general rate of growth. Such observations have actually been made during the early phases of development of the potato plant.

Other effects of potassium upon general metabolism have been studied in fruit trees. A lack of potassium was shown by disease-like symptoms in the leaves and by the poorer quality of the fruit in certain respects.

Conclusions.

The evidence as a whole indicates that potassium-deficiency may diminish carbohydrate and protein synthesis, and may be shown by the diminished production of dry matter. A relationship between growth-rate and potassium-content exists in certain phases of development of some species.

No constant relationship between potassium and the dry weights of translocated compounds has been observed; but when, under certain conditions of light, the rate of utilization of carbohydrates is low and the rate of storage rapid, a decrease in the total dry matter moved to the storage organ may result from potassium-deficiency.

To a large extent, as judged by external appearances, sodium may replace potassium, but, in certain species, plants grown with little potassium are prone to suffer from water-strain.

For the maximum development of the plant, potassium is necessary. Nevertheless, tubers and swollen roots can be formed without an abundant supply of potassium. The length of the period of light under which the plant is grown largely determines the use to which the plant puts the manufactured food-products. Even weak light used to supplement short natural daylight causes a more rapid upward growth, so that floral development may frequently be accelerated. To accelerate the process of tuber-formation short periods of light are often required, but an adequate supply of potassium is decidedly advantageous, as without such a supply the leaves do not attain their maximum efficiency as the manufacturing organs of carbohydrates—the products for which the tubers primarily are grown.

The common artificial manures containing potassium are: wood ashes, kainit, chloride (muriate) of potassium, and sulphate of potassium.

CONTRIBUTIONS FROM THE WISLEY LABORATORY.

LXIV.—Smut Disease of Dahlias caused by Entyloma Dahliae (Sydow).

By D. E. Green, M.Sc., Mycologist.

In the first week of August 1931, the Floral Superintendent at Wisley drew the attention of the writer to an unusual spotting on the leaves of the Dahlias in the collection under trial. The plants were partly raised from cuttings from roots stored from the 1930 season, partly new varieties added in 1931, some of which had been sent from abroad. Planting was done on June 8, and the plants were apparently quite healthy and made satisfactory growth during June and July. Two hundred and seventy-four varieties, representing the different types of Dahlias, were in the trial, and the total number of plants was about 822. Each variety was represented by a group of three plants, the space between these groups in the row was 3 feet 6 inches, and the rows were 5 feet apart. Each plant in a group was 2 feet 6 inches from its neighbour, so that there was ample room for development and adequate circulation of air. The site is considered very suitable for Dahlias, and is one upon which they have always grown well. All the usual types were represented.

A close examination of the plants revealed that the spotting was widespread and that all were more or less affected. Every variety had at least some of the lower leaves affected, while spotted leaves were evident up to a height of 3 feet from the ground in some.

Symptoms of the Disease.

The first symptoms take the form of small, light-coloured flecks or spots on the lower leaves of plants which are well established and growing rapidly (at Wisley this happened when the plants were just beginning to form their flower buds). The spots rapidly increase in size and are soon plainly discernible from both sides of the leaf. They remain more or less circular in outline, except where the presence of a vein limits the spread. They are easily noticed owing to their light colour, which contrasts with the darker green of the healthy tissue (fig. 110). The majority measure from $\frac{1}{16}$th to $\frac{1}{4}$ inch in diameter, but some reach $\frac{3}{4}$ inch diameter. The larger spots become somewhat varied in shape owing to the restricting effect of the smaller veins. As the spot increases in size the centre turns brown and dies. The effect then seen is that of a brown spot with a lighter band or " halo " around its margin ; this halo marks the continued outward growth of the parasite in the leaf-tissues. The brown central part generally remains



FIG. 11. MIGNON DAHLIA UNSHAKEN FIVE WEEKS AFTER THESE SIGNS OF ATTACK BY PYRENOMA DAHLIAE
(p. 337)



FIG. 113. SMALL FLOWERED PÆONY. DAHLIA UNSPRAYED. ONE MONTH AFTER FIRST SIGN OF ATTACK BY ENTYLOMA DAHLIAE.
(p. 337)



FIG. 114 SMALL-FLOWERED PÆONY DAHLIA SPRAYLD
Plant growing next to that depicted in Fig 11 .
(p 337)

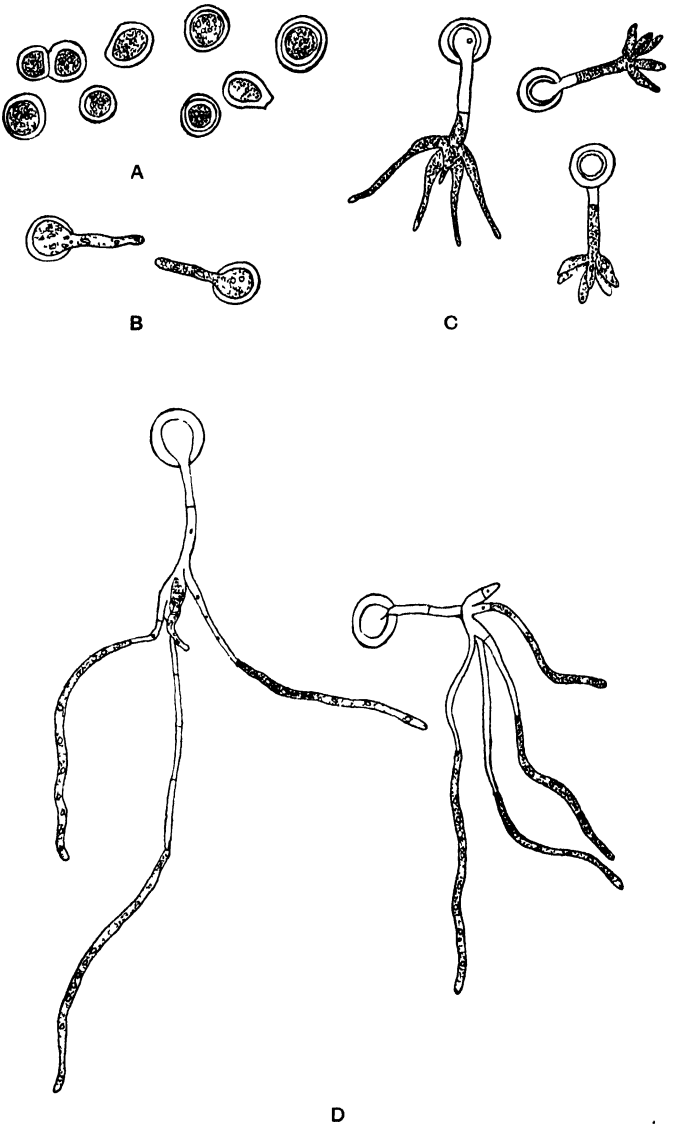


FIG. 115 ENTYLOMA DAHLIAE

A, Chlamydospores, B, Chlamydospores germinating after 22 hrs. in distilled water at 22° C., C, the same after 5 days, D, sub-branches of promycelium producing sporidia after 7 days

A, B, C × 400. D × 650.

[*To face p.* 333.

intact, but in some leaves it may fall out, and the leaf then presents a "shotholed" appearance (fig. 111). Even in these the "halo" effect still persists around the shotholes.

Additional spots continue to appear, and when present in large numbers on a leaf they may coalesce and form large areas of diseased tissue. In time most of the leaf blade may become involved: then the leaf shrivels and dies. Thus on severely affected plants defoliation soon commences. Even when the attack is less severe the plant becomes unsightly and its health and vigour must be greatly impaired. The effect on the different types of Dahlia will be discussed later.

Identification of the Parasite.

Microscopic examination of the affected leaves showed that the surfaces of the spots were producing tufts of needle-like bodies which



Fig. 116.—Transverse section through Dahlia leaf spot showing chlamydospores and tuft of sporidia forming on upper surface of leaf. × 150.

had no cross walls (septa) (fig. 116), and these bodies were released in enormous numbers when the material was placed in water. A section across the leaf thickness in the region of a spot further revealed that the inner cells of the leaf contained large numbers of thick-walled, spherical spores (fig. 116). These spores were being formed in succession inside the hyphæ (threads) of a fungus which was ramifying in all directions through the cells forming the leaf tissues. From their appearance and mode of formation these spores were chlamydospores. It was observed that a large number of them were germinating *in situ* and sending up germ tubes which were producing the needle-like bodies at the surface of the leaf. The latter were evidently the sporidia formed by the chlamydospores, and the fungus was identified as *Entyloma Dahliae* (Sydow).

The attack by this fungus on Dahlias was described in a short article by Dr. G. H. Pethybridge, of the Ministry of Agriculture, in

1928.* In that account it is recorded that the disease was first noticed in Great Britain in Surrey in 1927, and in Glamorganshire and Berkshire in 1928, but has been known on the Continent since 1918, and in South Africa since its first discovery there by Sydow † in 1911.

Characters and Affinities of the Fungus.

Entyloma Dahliae belongs to that group of fungi known as the Smut fungi. The attacks by the various members of this class of fungi on cultivated plants are well known, notably in those cases where the effect on the host is to produce malformation and the production of soot-like masses of spores, *e.g.*, Violet Smut. In attacks by other members of the group, however, the host plant is not malformed, and the damage takes the form of leaf spots similar to those caused by *E. Dahliae*.

In the life history of the Smut fungi the mycelium (mass of fungal threads) forms chlamydospores, which generally, on germinating, produce tube-like structures known as promycelia. From the promycelium further growth of some kind gives rise to the infective bodies known as secondary spores or sporidia. This is the usual procedure, although sometimes the chlamydospores throw out a germ tube and carry out infection directly. The chlamydospores are formed in the tissues of infected plants, and by virtue of their thick walls serve as resting spores which can survive the winter. They are generally only released by the rupture or decay of the diseased tissues, and when they germinate the resulting sporidia, on reaching a healthy leaf, set up the infection once more.

In some members of the Smut family the chlamydospores are not released but germinate in the leaf-tissue. *E. Dahliae* is one of this type—its chlamydospores germinate *in situ* and eventually the sporidia are formed at the surface of the leaf, whence they are distributed by wind, rain, etc., to other leaves. This is probably the procedure in most of the earlier-formed chlamydospores, but some of those formed later do not germinate immediately. These probably remain dormant in leaf debris, or in the soil, until the next season, when, under favourable conditions, they are able to germinate, produce sporidia, and so commence the disease again.

Description of the Organism.

The chlamydospores are approximately spherical, but as many are formed close together in chains they are often rather flattened in places (figs. 115A and 117). They vary in diameter from 11μ to 17μ, averaging 13·5μ (100 measured), and are yellow to light brown in colour, later becoming darker. The walls are about one-sixth the diameter of the spore in thickness, *i.e.* about 2μ in an average spore. The mycelium,

* Pethybridge, G. H., *Gard. Chron.*, November 17, 1928, p. 393.
† Sydow, *Annales Mycologici*, 10 (1912), p. 36.

from which they are formed, is slender and sparse—very little is seen in cross-section through a mature leaf-spot.

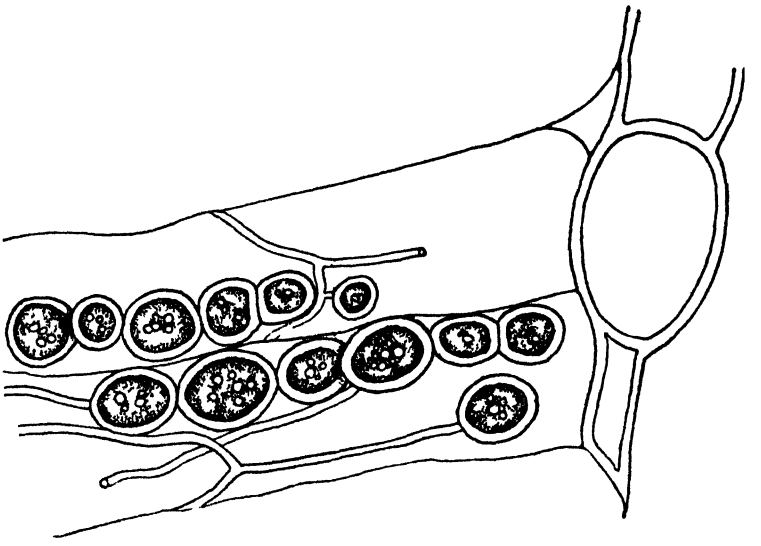


FIG. 117.—CHLAMYDOSPORES OF *Entyloma Dahliae* IN LEAF CELLS. × 650.

The sporidia are needle-like, some are slightly curved, and they have no cross walls (fig. 118). One end is generally less pointed than the other, showing where the sporidium was released from the hyphæ, on which it was produced. Their length varies from 45μ to 75μ, averaging 61μ (100 measured), and the thickness is about 2μ.



FIG. 118.—SPORIDIA OF *Entyloma Dahliae*. × 650.

Attempts to germinate the sporidia in the laboratory both in nutrient agar pH 7·0, and in distilled water at 22° C. have so far been unsuccessful. In the latter medium some sporidia appeared to produce the beginning of a germ tube, but this could not be induced to grow any further.

More success was obtained with the chlamydospores. In nutrient agar pH 7·0, at 22° C., germination was poor, with little resulting growth, but in distilled water at the same temperature a fair percentage of germination was obtained, and further growth took place. After eighteen hours a number of the spores had put out a tubular growth or promycelium (fig. 115B), and this grew steadily to a length equal to about twice the diameter of the spore; the latter being gradually emptied of its contents. After five days the promycelium had produced a whorl or rosette of sub-branches five or six in number (fig. 115C). Most of these

grew on into much thinner thread-like hyphæ, but some did not grow and were soon emptied of their contents. After seven days the thread-like hyphæ were producing at their ends bodies similar to the sporidia found under natural conditions on the surfaces of the leaf-spots (fig. 115D). The great number of chlamydospores seen in the leaf-tissues, each giving rise to three or four sporidia, accounts for the enormous number of sporidia which are produced and released from the surface of a leaf spot.

It is thought that the sporidia are the agents which spread the disease, but the exact method of dispersal is not yet known. They are probably distributed by various agents on to the surfaces of healthy leaves, where they grow, and the fungus entering the tissue and living on them again produces chlamydospores, which in their turn produce more sporidia at the leaf surface.

A preliminary test was carried out to gain information on the question of infection. Some leaves of young plants in pots in the open air were painted with a heavy suspension of sporidia taken fresh from a leaf-spot, but no infection resulted, and no spots appeared on the leaves. DICKINSON,* who has investigated sex relationships of certain Smut fungi in experiments with *Ustilago levis* and *U. Hordei*, states that here the sporidia are of different genders, and that both genders must be present for infection to take place. It may be that the sporidia used in the test (being taken from the same spot) were all of the same gender and therefore failed to cause infection.

It is hoped next season to study further this question of the origin and method of infection as well as that of the method, or methods, of over-wintering of this fungus. In the present state of our knowledge these points in regard to *E. Dahliae* can only be surmised by analogy with the methods of other Smut fungi.

CONTROL MEASURES UNDERTAKEN, AND THE RESULTS.

As soon as the disease had been identified at Wisley each plant in the collection was examined and all badly diseased leaves were removed as a first step towards control. The weather was very damp, and within a few days it was evident that this precaution would not be sufficient and that the disease was still spreading. It was therefore decided to spray the plants with Bordeaux mixture (4–4–50 formula). Five groups of three plants each were selected to remain as unsprayed controls. These were chosen from a list without regard to the amount of infection, which at that time was not serious on any plant. The spray was applied by means of a Four Oaks Barrel Sprayer (Battle pattern), using a lance with a Double Vermorel nozzle, and while this was being done the unsprayed (control) plants were covered up. The first application was made on August 8, twenty-four gallons of Bordeaux mixture being sufficient for the 822 plants (about three gallons for 100 plants). Saponin (½ ounce to twenty-four gallons of spray) was

* DICKINSON, S., *Proc. Roy. Soc.*, B, 102 (1927).

included in the Bordeaux recipe. The plants were all successfully sprayed in one day, although rain interrupted the work.

Despite the rain the spray was obvious next day on leaves of the first sprayed plants, but this may be due in part to the shielding effect of the upper foliage during the showers.

As the plants were growing rapidly and in view of heavy rains experienced, it was decided to spray again as soon as possible. Accordingly, on August 11, the weather being suitable, another spraying with Bordeaux mixture (4–4–50) was given. On this occasion no saponin was added. The day was fine, with occasional sunshine, and the spray dried quickly. It was seen that with nozzles discharging a fine, mist-like spray, good covering was obtained on even the youngest leaves, although saponin had not been included.

As the Dahlia may be considered a succulent and tender type of plant careful observation was kept for spray damage, but no injury of any kind from this cause was found on any of the varieties treated. It thus seems that Dahlias in this country can safely be sprayed with standard Bordeaux mixture. The spraying undoubtedly checked the disease, which showed no obvious spread on the sprayed plants up to the end of October, when the plants were past their best. Most of the leaves remained healthy, and defoliation, if any, was negligible.

On the unsprayed plants in every instance there was a spread of the disease, the rate varying with the type of plant.

The Mignon type was by far the most severely affected, and one month after spraying (September 11) the three control plants of this type had every leaf more or less spotted and defoliation was occurring. After five weeks these plants were badly defoliated, and except for some at the top of the plant, the remaining leaves were shrivelled and dead (fig. 112). The Small-flowered Pæony type controls also presented a very poor appearance when compared with sprayed plants of the same type in the groups adjacent to them. Most of their leaves were spotted, the lower ones were dead and some defoliation had taken place at the base (figs. 113 and 114). The unsprayed plants of the Collerette, Pæony and Camellia types were heavily spotted, but still remained good plants.

The table on p. 338 shows the progressive spread of the infection on the types used as control plants.

It will be seen that the Mignon and to a slightly less degree the Small-flowered Pæony types were most affected by *E. Dahliae* in 1931. The control plants of the Collerette, Pæony, and Camellia types showed that the disease was checked on the sprayed plants, but comparison with unsprayed plants also showed that, in 1931 at any rate, the disease had failed to do really serious injury to these types.

It may be that the disease was not favoured by the seasonal conditions, for, although the season was a damp one, providing high degrees of humidity, it was also remarkable for low temperatures, which may have inhibited the germination of the spores and so checked the spread of the disease.

Relative spread of infection on unsprayed (control) plants of different types.

Type.	August 11th (2nd date of spraying).	September 11th.	October 11th.
Mignon . .	Fairly heavy .	All leaves infected	Most leaves dead, with severe defoliation
Small-flowered Pæony	Fair; spots up to 2 ft. from ground level	Almost all leaves spotted	Plants heavily spotted, some dead leaves and some defoliation
Collerette . .	Fair . .	Gradual spread to top of plant	Heavily spotted
Pæony . .	Slight; spots 1 ft. from ground	Not much spread	Abundant spotting, but plants not much affected
Camellia . .	Slight . .	Very little spread	Abundant spotting, but plants not much affected

Discussion.

It is probable that the sporidia are the agents by which the disease spreads, but it is very desirable to discover the method of overwintering of this fungus. This is necessary so that, where the disease appears, measures may be devised to prevent a fresh outbreak in subsequent years. It is thought that all of the chlamydospores formed in the leaf spots do not immediately ripen and germinate but remain dormant on the soil or in leaf debris, or even adhere to the old stools, where they pass the winter. They can then germinate under favourable conditions the next season.

The origin of the outbreak at Wisley is not clear. It should be remembered that the roots stored from 1930 were cleaned of debris and inspected regularly during the winter. They were also well dusted with Flowers of Sulphur twice during that period. The cuttings taken in 1931 looked quite healthy in the frames up to the time of planting. All new plants were inspected and any of doubtful health were isolated for some time before joining the collection in the frames. The plants were growing in the open for two months before the disease was discernible, and then every plant was infected to some extent. The latter fact suggests infection in the frames, but it is remarkable that the spots did not appear until nearly two months had elapsed. Yet if the disease had originated in the open we should expect to find a centre

or centres of infection with the disease spreading outwards from them. There was no evidence of this, and judging from their appearance when the disease was first noticed every plant seemed to have become infected at the same time. The most probable source of infection must have been the new plants received from abroad.

In France late planting out is stated to favour the disease. This operation was done earlier than usual at Wisley this year, and it could not have been done safely before the time stated. It is extremely likely that if the plants had been put out later in the season they would have suffered much more severely from the disease, because they would then have become infected at a much earlier stage of growth. Fortunately at the time of its appearance they were already well established and growing rapidly. The ample space allotted must have been of some assistance, for there is no doubt that this disease would seriously affect the appearance of Dahlias massed for effect.

The hand picking of diseased leaves is a useful measure when the disease is first seen, but where a general outbreak occurs it is not likely to check the spread unless followed by thorough spraying.

With regard to the unsprayed plants, as far as could be judged the injury caused to the various types was as follows :—

Heavy.—Mignon.

Fairly Heavy.—Collerette, Small-flowered Pæony, Decorative and Dwarf Decorative.

Slight.—Single, Anemone, Pæony, Small-flowered Decorative, Cactus and Camellia.

Very Slight.—Star and Pompon.

ACKNOWLEDGMENTS.

The author's thanks are due to Mr. F. J. CHITTENDEN, V.M.H., for his interest throughout the progress of the work, to Dr. M. A. H. TINCKER for assistance in reading the MSS., and to Mr. F. C. BROWN for kindly taking the photographs.

MUSHROOMS.

By EDWIN BECKETT, V.M.H.

[Read April 5, 1932; C. G. A. NIX, Esq., V.M.H., in the Chair.]

IT may almost be counted as a legend of Aldenham, that the main stipulation that attached to my appointment to the charge of those very well-known gardens by the late Lord ALDENHAM was that I should guarantee to produce mushrooms for the kitchen the whole year round. There is a certain modicum of truth in the legend, though, as will be well understood, other qualifications were required as well; but his lordship greatly appreciated this form of vegetation, and was, indeed, a great expert on the edible fungi that are to be found in this country.

I will not pretend that I had unqualified success at the start; in fact, at one period I was greatly concerned because of partial failure; but once I was on the right track, I can safely say that I never looked back, and have been able to produce mushrooms from January 1 to December 31 for many years past. Of the finding of the secret, more anon.

When I listen to a lecture on the cultivation of any particular article, I like to hear at any rate a brief introduction to the subject, whereby a little of its history may be understood and kindred matters appertaining to it; and feeling that most audiences in the main are of similar mind, I will endeavour to approach along like avenues.

The word " mushroom " is one that should be understood to be a collective name, under which are placed a great number of species of fungi of which some are edible and a great many harmful, owing to their toxic properties; therefore every care should be used when obtaining these growths in a wild state, that their full nature is most clearly understood, otherwise serious consequences may result. The number of deaths that have been caused by the consumption of deadly sorts of fungi through the many generations that have elapsed since the greatness of Rome—for the Romans knew the mushroom and appreciated it to a greater or less extent—would, if they could be ascertained, prove almost incredible, and even to-day, when knowledge has advanced in the world, it is surprising the harm that is done through eating what appears to be an edible mushroom. Even the culinary sorts may prove harmful if used as food when in a stale condition, so that care is necessary with this article of diet, which is so greatly appreciated by the connoisseur. No hard-and-fast rule can be given as to which sorts may be eaten, and it is best, unless the mushroom is garden cultivated, to rely on the advice of a person who really knows what is edible, rather than experiment for oneself.

Although I have been constantly associated with what we call mushrooms since childhood, yet I should hesitate, even at my age, before I gathered and made use of anything growing wild other than the three most widely known species—*Agaricus campestris*, the common mushroom, which is the species that is so widely cultivated; *A. arvensis*, the Meadow or Horse mushroom, which is closely allied to the foregoing and found in fields, and is an article of commercial use, though of somewhat less delicate flavour; and thirdly, *A. gambosus*, the St. George's mushroom, a large form which appears in the spring.

Mushrooms, as we will now term them, have long been an important item in horticultural commerce, especially so in and around London, but despite the large quantities grown for market, there has always been a shortage of home-grown supplies, other than in the autumn, and many tons have been imported annually to meet the demands of the markets. There is no question that their extended cultivation would be a profitable undertaking for market growers, especially now that the fiscal conditions of the country have altered and will be likely to prove a deterrent to foreign imports.

Probably one of the reasons for the low production of mushrooms is the idea, still far too widely established, that their cultivation is a matter of considerable difficulty and calls for elaborately constructed houses. This is a fallacy, and here I return to the period when I was disappointed with my own lack of success. Despite the fact that my employer had built what was then considered an ideal and up-to-date mushroom house, we did not obtain the results wanted, and I looked round to find out what really was the matter. When visiting a garden, then under the care of an excellent Scottish horticulturist, in the course of conversation I related my difficulties. Like the sportsman he was, he most carefully explained to me his methods and took me to his growing quarters. Judge of my surprise when, arriving at the beds, I found, not an elaborate structure, but a roughly constructed shed of good length under a north wall, thatched inside and out, and the beds made up along the length, either side, with a pathway between them with splendid crops of mushrooms in all stages of growth. I shall never forget my surprise, nor the advice he gave me to "pull out your hot water pipes, do away with your fancy shelves, thatch your house like this, and endeavour at all times to imitate an atmosphere and temperature similar to those of a September night, when mushrooms grow so well in the fields." When one comes to consider it—what very simple advice it was, but gloriously real. I paid tribute to the instruction given, and the lesson learned, by following his teaching straight away, and, thanks to the help that old grower afforded me, I have never had occasion to look back. I have, and still use, shelves in the mushroom houses with great success, but that "September night" idea has always been the ruling dictum.

With the foregoing in mind, one can now see what opportunities there exist of increased growing. Old cellars, railway arches, sheds,

etc., could be employed, and no one should experience failure if the simple ideas are properly carried out with the necessary cultural details.

We will now proceed to consider the question of the bed, its material and its treatment, but before doing so, I would add that no harm will result if hot-water pipes are present in the mushroom house—say a four-and-a-half pipe running through it—as a means of raising the temperature, if desired, though the times when such an expedient is required are few and far between in our fairly high-temperatured country. In severe weather the temperature of the house, which should rule from 55° to 60° and should never be permitted to rise above 65°, can be raised by the simple means of spreading fresh horse manure in the pathway of the house and turning it once or twice a day, so that little or no fire heat is ever required. High temperatures mean poor quality mushrooms and rapidly exhausted beds.

The prime material for the beds is good quality horse-droppings of the same degree of freshness and from which only the longest of the stable litter has been shaken out, for the shorter litter undoubtedly lengthens the bearing period of the bed and improves the quality of the produce. The manure should be got together in an open, airy shed, as being the most suitable place for turning it, and it should be spread out to a depth of from two to three feet and turned every other morning for the first eight or ten days to sweeten it, working the most heated portion to the outside each time and the outer layer to the centre of the mass. After this period has elapsed, a turning every three days is sufficient, and the material should be quite ready in a total period of three weeks. For making the bed it should be placed in position and made as firm as possible by treading and beating with wooden rammers, being finally left of a depth of about 12 to 18 inches in winter and 9 to 15 inches in summer, after which it will heat up considerably for a time, reaching points well over 100 degrees, and then decline; so that when the temperature of the bed finally comes down to a point between 75 to 80 degrees, as shown by the use of a suitable testing thermometer thrust into it, spawning can take place. The beds for indoor cultivation should be flat surfaced, as this is best for the regulation of heat and moisture, and the depth of manure can be lessened where the bed has an earth base. Consideration of moisture is important, and the water content of the mass should only be about one-third, otherwise there will be a danger of bad effect upon the growth of the spawn through the supply of free air being diminished to too low a point, if not, indeed, stopped altogether. A good rough test for this detail is to squeeze some of the material together in the hand, and provided no water is pressed out and the manure binds just nicely under the pressure, and does not sound squashy to the ear, then it is in just the right condition. During the period that is devoted to the rise and fall of temperature of the bed, a covering of straw is of benefit, in order to conserve the water content and prevent undue evaporation.

The class of spawn to be used is an important matter. Some growers prepare their own, and a reference to this operation will be made later on, but this is a practice that is getting less general nowadays, owing to the really reasonable prices at which ideal spawn can be purchased from firms who specialize in its preparation. There are two forms of this commodity: it can either be purchased in the well-known bricks, or in the more modern form, packed in cartons and looking like fibre. I have used both kinds, and find both to be highly effective from the production point of view, the modern fibre-like spawn being perhaps just a little more convenient to use. Whichever is employed, it should be obtained from a really reliable source, as very poor results can come from inferior kinds.

The cake of spawn should be quite fresh and should be broken into pieces about the size of a hen's egg. If found to be very dry, as may well occur in summer, they should be soaked for a short time in warm water. Holes should be made in the bed about nine inches apart and two to three inches deep, and into these the pieces of spawn should be inserted, covering them with the material taken from the hole and making all firm again. The fibre spawn, as I must still call it for distinction, is similarly used, and directions for this purpose are supplied by the manufacturers. Exact guidance as to what is the right condition of bed material and of the bed itself after making, can hardly be given by word of mouth, for practical experience is the real guide, and an observant grower will soon attain a sense of nicety on these two points. The soil covering that is required after the spawning operation is best delayed for a week or ten days, until which time the straw layer may be replaced to conserve the moisture. Selection of suitable soil for the casing is important, for it is not desirable to have rich loam or cultivated soil for the purpose. I consider the ideal medium to be old pasture top-spit, finely chopped up, and rubbed through a sieve in order to retain as much of the fibre as possible. It is a great advantage to have this material steam-sterilized where possible, in order to destroy weed seeds, insect pests and fungi that may easily prove harmful. The manure gets sterilized in the heating up, and spawn is also sterile generally, so that an endeavour should be made to have the soil in the same condition. Where it is not possible to do this, a light, sandy loam of friable character should be used, as being less likely to contain harmful matter. When the soiling is to be done, remove the straw layer, and have the soil in a just nicely moist condition. Apply a layer, two inches deep, as evenly as possible over the bed, and then firm by beating down with the back of a spade or shovel until it is diminished to an inch in thickness, as greater firmness is not desirable. Too great a depth of soil and too deep planting of the spawn should be avoided; I have learned by experience that if this point is not carefully attended to, the mushrooms will not rise properly above the surface of the bed. After the soiling is completed, a good layer of fresh stable litter should be strewn over the surface,

and in winter the depth of this should be considerably increased, and replenished as required.

The watering of the beds is a very important matter, for it must be remembered that a moist atmosphere is essential to the well-being of the crop. It must be pointed out that this does not mean an atmosphere so heavily humid that it may easily cause drip to take place from the roof, etc., but one that may be best described by the term "damp." Heavy watering, whereby beds become saturated, must always be avoided, for if an examination of the bed is made just before the soil cover is applied, the spawn will be found to be "running," or in other words, travelling through the manure, and material like a mildew, or very light cotton floss, will be noticed spreading all ways, the basis of the future crop. Saturation is therefore most undesirable, in fact very harmful, and the ideal condition is one that permits a certain slight evaporation of moisture from the soil. Beds should be watered during the summer period by frequent sprinklings, which usually need to begin only when the crop begins to appear. In hot, dry spells this should be done twice daily, and the floor of the house damped down to assist in the preservation of the ideal moist atmosphere.

To maintain supplies, beds should be made up and spawned at intervals of, say, two or three months, for it is better to have a number of small beds than to rely on one or two large ones. Autumn-made beds may prove rather long in giving a yield, sometimes holding fire until the spring, when they will continue to give supplies, if the bed is well prepared, until the autumn. Usually beds come into bearing from six to eight weeks after spawning—though circumstances, such as temperature, moisture, etc., may delay the period—and will continue to yield for two or three months; and where it is desirable to ensure the latter period for light picking, the reduction of the temperature of the house to 50° will assist.

Even in the open air a practically unbroken supply of excellent mushrooms may be obtained all the year round if the time necessary and the requisite material can be afforded. The beds must be constructed in ridge shape, commencing with a base from five to six feet wide, building as firmly as possible by treading, etc., and shaping up neatly to quite a narrow ridge at the top. In summer such beds should be built on the north side of a wall or shed, as being cooler, the wall affording shelter in the hottest part of the day. Plenty of material should be available for completely covering and protecting the beds during cold, harsh weather, and if this, and the preparation of the bed, be seen to, and other details carried out carefully, then an excellent yield should be attained.

Mushrooms should be picked daily just before they open out their tops, and should be twisted from the bed and trimmed afterwards; never cut from it with a knife. The longer the mushroom is left on the bed, the more it will expand and grow, until it will rapidly lose the very delicate flavour that is so desirable and soon reach a point at which it is no longer fit for the table.

Three pests that must be keenly watched for in the mushroom house are slugs, snails and woodlice, and steps must be taken to exterminate them. They have a particular liking for the crop, and unless eradicated at once will be a considerable trouble and cause great damage.

I do not propose to deal with the possibility of spawning meadow land. I know that it is done, often with good results, but as I really think it is, more or less, a considerable gamble, no useful purpose would be attained by detailing it here. Neither do I propose to set forth any of the many fine recipes for preparing the mushroom for table, as that subject is certainly the business of the cook.

For a few concluding remarks, I would, as promised, detail the preparation of the bricks, outlining the idea of the process for those who may be interested in it.

It must be borne in mind that the mushroom family is a spore-bearing group of plants, from which arises a material termed mycelium, which is the growing stock of the article we know as a mushroom. Examination of the edible portion gives one the impression of a cap on a stalk, and inspection of the underside of the cap shows a number of thin fleshy plates, or gills, radiating from the stalk, and it is on the sides of these that the spores are formed. In preparing spawn bricks, there are various media used as a base for impregnating with the mycelium, and a general type is prepared by mixing fresh horse droppings and cow manure in about equal proportions (some prefer less of the latter material) with a little adhesive loam to hold them together. These constituents are mixed together with liquid stable manure until as soft as mortar, then spread out on a floor to dry off until sufficiently firm to shape into bricks of suitable size and shape; these should be set on edge and left until about half dry. Then a hole should be made about an inch in diameter in one side and this should be filled with the mycelium and closed with a similar mixture to that of which the brick is formed. The mycelium for this purpose can be obtained from various sources—the white fibres appearing in beds where mushrooms have seeded down, in stable manure heaps, mill tracks of horses in fields, under sheds where cattle have been kept, and in various other places. It is generally considered that the best time for collecting is from July to September, the mycelium being at its best in the latter month. The bricks (which at this stage must be handled carefully as they are very easily broken) should then be placed over a hotbed of fresh manure for the mycelium to be encouraged to permeate the whole mass, building the bricks in a pile, allowing a space between each two, and covering with litter so as to maintain a temperature of about 60°. Examination of the bricks will show the progress of the filaments, and when the whole appears as a white cloudy substance, not advanced to the thread-like stage, the bricks should be removed for drying off, and then sorted in a cool dry place; this will prevent any further vegetation until they are required for use. The other methods of doing this work are really only variations of the same process (and many in

number), so that the details set out may fairly claim to describe the process of preparing the spawn bricks that are familiar to raisers of mushrooms. It is wonderful how the mycelium under suitable growing conditions will progress, for we frequently discover it creeping along the walls and shelves of the mushroom house, coming out of the mortar between the bricks, and even developing into mushrooms in such curious spots.

In the paper which I have just had the honour of reading to you I have endeavoured to present an interesting discourse on the cultivation of an important, delicious and very wholesome food, and, though I have shaped my remarks mainly for the amateur and the private grower, yet they can equally well be applied by the trade grower. Folk of the latter category of course act on different systems, many in fact growing their mushrooms in glass-houses, pits, and under the stagings of plant houses, all of which are easily adaptable for the purpose, though probably a trifle more complex for the first group, who will, no doubt, depend principally on sheds, cellars and such like places, or beds in the open ground. I trust, however, that whoever hears this discourse, or reads it later, may find it of interest, and I further hope that it may prove of service to a good number of growers and would-be growers. It always affords one, and more especially the amateur, the greatest pleasure to be able to pick, as well as to show their friends, their own-grown mushrooms.

BULBS THAT CAN BE GROWN IN BRITAIN.

By G. W. LEAK, V.M.H.

THERE has recently been increased interest in the production of British-grown Bulbs. This is due to two or three causes: (1) The slogan "Buy British." (2) The propaganda by the Empire Marketing Board by posters, and the planting of British-grown Bulbs in the Royal Parks and Gardens in London. (3) The request by the Ministry of Agriculture that Bulb Growers in Britain should increase their cultures and thus not only decrease imports and keep more money in the country, but what is of still greater importance, employ more British labour.

No crop that is grown employs more labour to the acre, and it is safe to say that all round, cultivation of bulbs costs in labour £50 an acre. That is nearly £1 an acre a week. It is estimated that if we are to do without any imported bulbs, it will be necessary to increase the area of British-grown bulbs by 10,000 acres.

Custom and the public have come to speak of nearly all bulbs as "Dutch Bulbs," but why not "British Bulbs," for with the probable exception of Hyacinths nearly all bulbs can be just as well produced in Britain as in Holland. It has to be recognized that the Dutch have for generations made the cultivation of bulbs a national affair, and the experience they have gained through years of continuous cultivation places them in a very advantageous position. Bulb-growing cannot be undertaken without great financial risk by anyone who has not gained the necessary experience, and particularly at the present time when, as the result of the restricted purchasing power of the public, bulbs which are regarded as more or less a luxury are being sold at a price which in many instances yields no profit to the producer.

The chief consideration a beginner in bulb-growing must have in mind is that it is useless to produce anything but bulbs of the best quality. Dutch competition is such that anything but the best is of little value.

It has been the custom with many growers of Narcissi and Tulips in England to regard the marketing of the flowers as the principal return, and the sale of any surplus bulbs as a secondary matter; but it is questionable if there is room for further increase on those lines, as the markets are already so frequently blocked with flowers as to make the prices quite unremunerative. Where a grower specializes in a particular variety or varieties which are of distinct merit for cut flowers the return may be profitable, and it is always advisable to plant, when possible, new and improved varieties which supersede older sorts. The progress in the improvement of Narcissi, for instance, is so great, that many of those which are now grown in quantity will in the course of a year or two be entirely "out-of-date." The advice

of a reliable grower should always be sought when the selection of varieties is being made, unless one has a knowledge of modern introductions. It should also be borne in mind that the varieties which are commercially in the greatest demand are those which will force easily. This particularly applies to Narcissi and Tulips. It is estimated that 60 per cent. of the Narcissi and Tulips imported from Holland each year are used for forcing for market cut flowers. It is usually much more economical to cultivate a few good varieties in quantity. There is a certain market for those most in demand, and it is quite easy to be led into growing a number—for the sake of variety—which do not meet with a ready sale.

The soil in which most bulbs grow best is a deep loam, well drained. A water-logged soil at any stage of growth means failure of crop. The best soil, so far as England is concerned, is alluvial deposit, such as that in South Lincolnshire and North Cambridgeshire and in some of the Southern Counties. A sandy loam, if well drained, also grows most bulbs very well. If bulbs are to be well grown the soil must be in really good "heart." Tulips require a very rich soil; Narcissi one not quite so rich. A good crop to precede bulbs is potatos, as it brings the soil into the necessary tilth, and if the land has been really well manured for potatos, it should be in good condition for bulbs. Deep cultivation is essential. The method of planting will depend largely on the area. It is customary, when Narcissi and Tulips are planted by the acre, to plant with the plough at a depth of about 4 inches, the furrow being 9 to 10 inches wide. The bulbs are placed up the furrow at a distance of 2 to 3 inches apart, according to size and variety. The more vigorous growers require the greater amount of room. When smaller quantities and special varieties are being dealt with, it is usual to plant in beds about 4 to 5 feet in width and any necessary length.

The cost of stock for planting an acre of bulbs is very considerable. Presuming that one wishes to plant Narcissus 'Emperor,' 140,000 bulbs to the acre will be required; Poeticus varieties, 180,000 to 200,000; and Incomparabilis varieties from 150,000 to 160,000, according to variety. Tulips take about 150,000 to the acre. Narcissi are generally graded in three sizes, and planted to be lifted the first, second and third year after planting. Tulips must be lifted every year.

There is probably a greater opening for the growing of some of the smaller bulbs commercially than for Tulips and Narcissi. Snowdrops have been collected from private gardens in various districts of England for many years by travelling hucksters and disposed of to bulb merchants. As a result the supplies are very irregular, as are the samples. Snowdrops seem to flourish in most soils, and are not at all particular as to the situation in which they grow. They multiply fairly rapidly, and the price at which they are sold varies very little from year to year. If cultivation is systematically followed they will find a ready sale and should yield a fair profit. The double variety is much scarcer than the single and realizes a higher price.

Crocuses are now grown in England commercially, but not on a large scale. It has been left to Holland to provide nearly all the necessary supplies, and yet they can be quite as successfully grown in England. The large yellow variety does even better in England than in Holland, as it is not subject here to a disease which frequently affects it in Holland. Early planting must be resorted to if success is to be attained, and the corms should be planted not later than September, but August is better. Plant in beds as for Tulips at a depth of about 3 inches. The number of corms required is about 1300 to 1500 for a bed 5 feet by 50 feet. If large-size corms are planted, they are best lifted each year, when the foliage is quite dead; the small size may remain in the ground for two years, or longer if necessary; but this usually results in clumps of 4 to 5 corms being formed which are flat-sided and unshapely.

Anemones are quite successfully cultivated in Britain, chiefly for market cut flowers, and there is now quite a fair acreage in Cornwall for this purpose; but there is no reason why they should not be grown for the roots (rhizomes) as well as for the flowers. In fact, the grower should always have in mind the dual purpose. The French and 'St. Brigid' varieties may be grown from seed sown in the month of June. The seed should be from good strains, otherwise it will probably be found that when the flowers appear, deep blue will predominate, as that colour grows and flowers more freely than the others. In a good strain the blues are chiefly eliminated when seed-saving. For market, reds should predominate rather than blue. If roots are planted in preference to raising from seed the small sizes known as "buttons" should be used. They give flowers freely, and if well cultivated quickly make large roots for shop sale. Propagation by division of the dry rhizomes from September to March may be followed if desired. There is always a good sale for *Anemone fulgens* either as flowers or roots. They are best grown from divided roots, as when grown from seed the flowers vary very considerably.

There is no plant that can be more easily grown from seed than Winter Aconite (*Eranthis hyemalis*). This also succeeds on most soils in Britain much better than in Holland, and many thousands are exported to Holland annually. Seed should be sown in September in good sandy loam, with the addition of a little leaf-mould if obtainable. It is usual to sow in a position where they can remain until the roots are large enough for sale, which is two to three years. They may also be propagated from division of roots in the autumn. Roots are also divided for sale, as with *Anemone fulgens*, but roots from seed are preferable, as there is the tendency with divided roots when put into store to develop a fungus growth, which, if not kept in check, causes the bulbs to decay.

Dutch and Spanish Irises are imported in very large quantities both for forcing and outdoor growth. For forcing, the Dutch varieties have almost entirely superseded the Spanish. They bloom earlier, are much stronger growers, and the colours are quite equal to, and in some

cases better than, the Spanish. All these Irises can be grown at home to be quite as good as the imported bulbs. For forcing, well-grown British Irises are certainly better than Dutch-grown. Imported bulbs of varieties like ' David Bles ' and other Tingitana hybrids have to be very large and well grown to produce 80 per cent. of flowers when forced, whereas the same varieties will produce 90 per cent. to 95 per cent. of flowers from a smaller-sized, home-grown bulb. Some of the largest English forcers of Dutch Irises now grow their entire stock for that purpose, the result being so much better than from imported bulbs. Where large quantities are grown Irises are planted with the plough, as with Tulips and Narcissi, at a depth of 3 inches. Smaller quantities are planted in beds. The initial cost of planting Irises is considerably less than for most other bulbs, as planting stock can be purchased at very moderate prices.

Chionodoxa is another bulb that can be quite easily grown in Britain, as it flourishes in any good loamy soil. The chief source of supply for many years has been Asia Minor, where *C. Luciliae*, *C. sardensis* and *C. gigantea* are collected by the million. During the last few years considerable quantities have been grown in Cambridgeshire from seed, which is the only way of growing them, and the bulbs are in every way superior to imported ones. They are larger, firmer and produce much finer spikes of flower. The seed should be sown in beds in July-August, where they are to remain for two to three years until of saleable size. It is not wise to plant small-size Chionodoxas. The bulbs will certainly grow larger, but when lifted they have a very rough skin and are of poor appearance, whereas the bulbs from seed have a clear, smooth skin. No increase in quantity can be expected from transplanted bulbs. They will increase in size for several years if left in the ground, but do not throw offsets. They seed very freely.

Muscaris—although not in such great demand as some of the afore-mentioned bulbs—can be easily cultivated, as they are of vigorous constitution and increase very rapidly. Muscaris also force very well, and there is an increasing demand for bulbs for that purpose. ' Heavenly Blue ' is the best-known variety and the one most asked for. *M. armeniacum* is earlier and a splendid variety. Muscaris must be planted early, as fresh root growth begins in late July, and the foliage is well above ground in September. Very few flowers are produced the first year unless early planting is resorted to.

There has been during the last year or two a considerably increased interest in Lilies generally, but particularly in those hardy species which can be grown successfully in Britain. The process of increase in Lilies is generally slower than with most other bulbous subjects. Some varieties, such as *Lilium regale*, can be grown from seed, but it is usually about three years from sowing before the bulbs are of saleable size. This Lily is now in very great demand, as it succeeds in almost any soil, and is not subject to disease. Many thousands of *L. candidum* are imported from the Continent annually, but by far the

best bulbs are home-grown. They may be seen growing in cottage gardens, where they are frequently left undisturbed for years, and yet flourish and flower to perfection. Many thousands annually are collected from such gardens, as with Snowdrops. *L. candidum* resents being disturbed, and it should be left in the same position for three years. Plant very shallow, as the bulbs are always better and harder when near the surface. August is the best month for planting. *L.* × *testaceum* (*excelsum*) is another very hardy Lily that frequently flourishes in cottage gardens and is now very scarce. No Lily is easier to grow if it has correct treatment. Like *L. candidum* it resents disturbance, and is better left in the same position for three to four years, when it increases as fast as any Lily. It must not be planted too deep. The best way of increasing stock, apart from the natural divisions by growth, is to take off the outer scales of the bulbs and plant them in good loam. Sand should be placed beneath the scales and a little sand placed on them, then cover with good loam to a depth of 2 inches, and in winter cover with leaves or straw for protection against frost. In about two years most of these will produce small flowering bulbs. *L. croceum*, *L. Martagon*, *L. Martagon album*, *L. Thunbergianum* and *L. umbellatum* and their varieties are all hardy and profitable to grow and meet with a ready sale. A grower who makes a beginning in cultivation with any of the foregoing smaller subjects and will pay attention to detail, which will result in the production of first-class stock, can undoubtedly find a ready and profitable outlet for them, but there is no demand for inferior samples.

ROOT-GRAFTING RHODODENDRONS.

By Mr. S. BOWLER, Head Gardener to
Sir STEPHENSON KENT, K.C.B.

WHILE there are many species of Rhododendron that may be readily increased by cuttings, there are a great number that fail to root by ordinary methods.

During the past winter I have made several attempts to overcome this difficulty and to find a method by which these difficult species may be propagated other than by grafting on stocks of *Rhododendron ponticum*. Among other ways tried was a form of root-grafting, which was in many instances successful, and although the experiment is still in its infancy, I think that this method will solve the problem.

At present I am led to believe that this form of propagation is best performed during January or February, when both the growth and the root are dormant.

Those who are familiar with Rhododendron grafting will at once see the idea of the root-graft, namely, the wedge-grafting of suitable roots under a bud, using the whole of last year's growth as the scion; others who are not experienced in these matters may benefit by the following detailed explanations.

Shoots should be selected as scions that have a terminal growth bud, not flower bud. The whole of the previous season's growth is taken, with about half an inch of the older wood. A clean cut should be made at the base under a bud as in fig. 119. An incision is then made under a bud near the base of the shoot. In dealing with species such as *R. decorum* or *R. sutchuenense*, the incision should be started at about half an inch below the bud, cutting upwards to about half an inch above the bud.

Roots may be taken from any free-rooting Rhododendron, such as *R. ponticum*. There will be no danger of future suckers as there are no buds present on the roots. These roots should be very fibrous and be taken from strong-growing young plants; it is very important that they should be kept moist up to the time of grafting and potting. The size of the root should be in accordance with the dimensions of the shoot; where large-leaved plants are to be grafted, such as *R. Falconeri*, two or three roots may be inserted under as many buds to more or less balance the plant.

The thick end of the root is shaped in the form of a wedge with a very sharp knife. It may then be pushed firmly into the incision made in the shoot. A perfect fit is essential, otherwise the graft will fail.

Grafting wax is not necessary if strong, soft raffia is used to bind the grafted portions; they should be bound firmly but not too tightly.



FIG 119 — ROOT-GRAFTING RHODODENDRONS.
The graft after six weeks.

To face p 352.

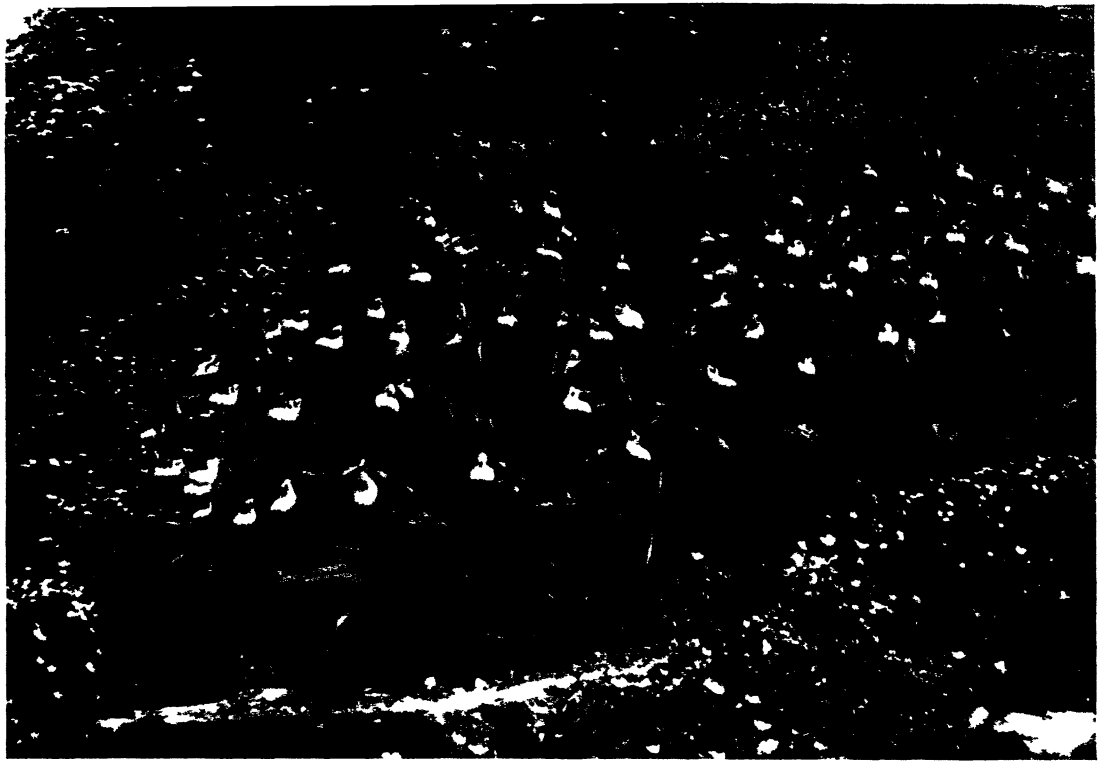


FIG. 120.—CYPRIPEDIUM CALCEOLUS AT HIGHDOWN

The grafted shoots should be potted in a light, free-rooting mixture of peat moss and sand.

It is essential that the grafted plants should be kept quite close in an airtight propagating case or under cloches, where a moist growing atmosphere of 50° to 55° F. can be maintained. I would recommend that the plants should be lightly shaded at all times, applying heavier shading material during sunny weather.

It is very important that the case should be kept quite close and only opened at rare intervals for an occasional watering.

Species that have soft, green shoots will unite in a month or so, but the majority take longer.

A few of the plants I have successfully propagated in this manner are: *R. sutchuenense*, *R. Falconeri*, *R. decorum*, *R. fulvum*, *R. rotundifolium*, *R. chaetomallum*, *R. auriculatum*, *R. argenteum*, *R. Griersonianum*, and *R. Loderi*.

[Plants showing perfect union of stock and scion, and beginning to grow, were shown by Mr. BOWLER before the Scientific Committee of the Society on April 5, 1932.]

CYPRIPEDIUM CALCEOLUS.

THE plants of *Cypripedium Calceolus* depicted in the accompanying photograph (fig. 120) were planted about 20 years ago in Mr. F. C. STERN'S garden at Highdown, Goring-on-Sea. There were originally six plants purchased. These have increased year by year, and during the last few years seedlings have appeared in the cracks between the rocks and in the path below the parent plants. The position in the rock garden is facing practically due north, and though somewhat protected from the north wind, it is open to the east wind. The plants are growing in the ordinary top soil of the garden, which is full of chalk, and underneath at about 1½ to 2 feet is the hard rock chalk of the chalk pit. The plants have never been moved; they are top-dressed each spring with the ordinary soil of the garden. The plants flower better every year, and this year the number of flowers was uncountable.

THE AWARD OF GARDEN MERIT.—XX*

By F. J. CHITTENDEN, F.L.S., V.M.H.

148. NERINE BOWDENII.

Award of Garden Merit, January 23, 1927.

The late Mr. JAMES O'BRIEN tells us in " Flora and Sylva " (vol. **8,** p. 120) (where there is a good figure of *Nerine Bowdenii*) that the first plants were sent home to " Mrs. CORNISH-BOWDEN of Newton Abbott by her son, a government surveyor in South Africa, who came across it in an out-of-the way district near King William's Town. The native boys had much difficulty in getting the roots, which grow only in the most inaccessible spots among the mountains." It flowered at Kew, with Messrs. VEITCH of Exeter, and with Mr. GUMBLETON in Ireland in October 1904, and has since been widely distributed and proved hardy in well-drained, sheltered places in many parts of the country. It was planted at Wisley about 1908 on the border near the Long Pond, where it is sheltered from wind and gets the sun, and it has flowered there every year since in October.

The flowers are large for a Nerine, measuring about 4 inches or more across, and the bright rose-pink spreading segments, more or less wavy at their margins, remain in beauty for many days. They are carried in an umbel of six or seven on a stem a foot or so high. The leaves appear at about the same time as the flowers and remain green through the spring. Sandy fibrous loam suits *Nerine Bowdenii* best, but once planted it is best left undisturbed.

149. ACER PALMATUM ATROPURPUREUM.

Award of Garden Merit, July 30, 1928.

Japanese Maples are among the most valuable of trees with coloured foliage. Carefully placed and used sparingly, many of them will enhance the beauty of the garden the summer through, and the variety to which the award is given is one of the most generally useful, although not the most brilliant in its autumn tints.

Acer palmatum is one of the most variable of trees in the form and coloration of its leaves, and some of the varieties with the more delicate shades of colouring and the more finely cut foliage can be grown well only in favoured districts. This variety, though apt to be cut

* The notes on the first hundred plants to receive the Award of Garden Merit, which appeared in our Journal, vols. **47** to **53,** have been published in pamphlet form, and may be obtained from the R.H.S. Office, Vincent Square, Westminster, S.W. 1, price 1s. For later notes see vol. **54,** pp. 218 and 423 ; **55,** pp. 121 and 276 ; **56,** pp. 80 and 245 ; and **57,** p. 65.

by late spring frosts, soon recovers, and may eventually make a tree of fifteen feet or so in height in any part of the southern half of England.

The leaves are deeply divided into five lobes with sometimes another pair of lobes at the base, sharply toothed, about 3 inches long and rather more in diameter, and permanently purple, beautiful when the sun shines upon them and glowing with red-purple tints when the sun shines through them. The flowers are small and purple, and as a flowering tree this Maple is negligible; it is for its foliage alone that it is worth growing.

A good loam or a peaty soil, moist but not really wet, suits it well, especially if the site be a sunny one protected from north and east winds in spring; and it is seen at its best when it has a background of dark green foliage, evergreen, or of the type of Pyracantha, which acts as an excellent foil.

There is a very good picture of the foliage of *Acer palmatum atropurpureum* and a note by M. L. Van Houtte in "Flore des Serres," t. 1273, vol. 12 (1857), p. 175.

150. ANCHUSA MYOSOTIDIFLORA.

Award of Garden Merit, June 7, 1928.

Anchusa myosotidiflora was discovered in 1800 in woods north of Tiflis, and it is known now wild over a fairly wide area both east and west in Western Caucasia. It was introduced to cultivation in England about a hundred years ago, but did not become widely distributed until recent years. There is little wonder that on its first discovery it was called *Myosotis macrophylla*, for its flowers bear a great resemblance to those of a forget-me-not, though its large, almost heart-shaped lower leaves do not call to mind any of the commoner species of Myosotis. These large leaves are, perhaps, the main drawback to this fine plant, for they render it rather unfit for the small rock garden, though, on the large, it may well be accommodated. It is, perhaps, best treated as a border plant or as a plant for the semi-shade of a shrubbery, though it will thrive in full sun provided the soil is moist; and it is not particular as to soil. It is perfectly hardy and perennial, and produces its many blue flowers carried well above the foliage in spring and early summer.

We have retained the name by which the plant has been grown in gardens for very many years, but Dr. STAPF, in the *Botanical Magazine*, t. 9110, where there is a good figure, has followed STEVEN and placed the plant in the genus Brunnera, under the name *Brunnera macrophylla*.

Seed affords the easiest way of propagation.

GEORGE FORREST, 1873–1932.

" Here he lies where he longed to be;
Home is the sailor, home from sea,
And the hunter home from the hill."—*R.L.S.*

FATE deals her mortal blow oftentimes at most inopportune and unexpected moments, and GEORGE FORREST's death on the eve of his departure for home is yet another instance of such unkind coincidence. The heavy work of the expedition was practically over and there was no mention of ill-health resulting from any of the hardships of travel. Apparently on January 6, 1932, he had been out shooting some four miles from Tengyueh, and suddenly feeling faint, he had called to his men to come to his assistance. They reached him as he collapsed, and all was over in two minutes. Men of his robust type may end thus from heart-failure. In the old sagas the heroes looked askance at a " straw-death," preferring to fall in the field. Much as we all lament his untimely passing, his end was that of a lover of the wild and of the open. He lies in the graveyard of Tengyueh, side by side with his aforetime comrade Consul LITTON, who died after their adventurous journey to the upper parts of the Salween Valley in 1906.

In this brief personal tribute to a great explorer space must be found for a glance at his early life. It is of more than passing interest to know how opportunity fashioned the man and how the man made full use of opportunity. Born at Falkirk on March 13, 1873, he had his education at Kilmarnock Academy in Ayrshire—the usual hard but withal sound training which seems to urge so many of Scotland's sons to seek their fortune abroad. On leaving school his first venture was a post in the shop of a pharmaceutical chemist. This was probably little to his liking, but he stayed long enough to acquire a useful knowledge of medicines and simple surgery, which was of great avail to him in later years when both Chinese and Tibetans sought his aid. Much of his influence with all classes in Western China was due to his generous spirit in giving both time and money to the alleviation of their sufferings. Time and again he had lymph forwarded from Burma at his own expense, and inoculated thousands of the inhabitants of Western Yunnan. When he could be induced to speak of his experiences as medical attendant his anecdotes were full of self-criticism as well as of humour. As an embryo pharmacist at Kilmarnock he had to devote some time to the study of botany, and acquired an acquaintance with his native flora, collecting and drying many of the local plants. After this interlude he made his way to Australia to find what fortune he could. Here he spent several years, chiefly in the open and in the " bush." Then was fashioned the GEORGE FORREST we knew, with sturdy frame, deep chest and tough muscles, for he had plenty of hard work with the felling-axe and of hard riding on the sheep-stations. There was, however, but little prospect of advance-



FIG. 121.—GEORGE FOREST V.M.H.

[*To face p* 356

ment, and he returned home in 1902; making a short stay in South Africa *en route*. His previous interest in plants induced him to apply to Professor Sir ISAAC BAYLEY BALFOUR in Edinburgh on the chance that employment could be found for him. Nothing was then available except a meagre post in the Herbarium, which, fortunately, he accepted —until something better came into view. Indoor work on dried plants was a decided change from life in the Australian bush. But as an antidote he lived six miles out of Edinburgh, tramped both ways each day to the Botanic Garden, and stood to his task from nine till five, disdaining the use of chair or stool. FORREST's line of choice never led him to the easy path, and he was ever his own hard taskmaster. But once again chance proved a kindly guide, for his duties involved the scrutiny and arrangement of thousands of specimens from all over the world, and he acquired in these two years a sound acquaintance with the chief families and genera of flowering plants. To this experience also is no doubt due the wonderfully fine quality of his dried material —*O, si sic omnes!* Any ill-effects of an indoor occupation were nullified by his keenness for fishing and shooting, for tramping in hill country, and for gardening. His interest in these continued to the end. He was but little attracted by games. He may have seen in his time a football or cricket match, but in a long acquaintance I cannot recall an instance of his attendance at any sporting event where thousands congregate. The best of companions, he had no liking whatever for the town, and was generally restless and unhappy there. In the country he was quite a different man. His friends will always call him to remembrance as the sturdiest of figures, clad in the trim knickerbockers which were his almost invariable wear. Determination was stamped on his somewhat grim features, and he might well have borne the badge *Nemo me impune lacessit*. It was but rarely he offended his own feelings and those of his friends by garbing himself when occasion demanded in the clothes deemed to befit a townsman, and never was he seen in plus-fours. The ineffaceable impression he left on all who met him was that of a man who knew exactly what he wanted to do and was certainly going to do it.

To the man of thirty-one thus fashioned and equipped came his opportunity in 1904. Mr. A. K. BULLEY, of Neston, Cheshire, keenly interested in alpine plants, applied to Sir ISAAC BAYLEY BALFOUR for someone who was qualified to undertake botanical exploration in Western China, and FORREST entered a field which he was never to forsake. The richness of the flora of the provinces of Western China was long unsuspected. The botanical collections of Professor AUGUSTINE HENRY were evidence enough for the less westerly areas ; the material obtained by the French missionaries such as DAVID, SOULIÉ, and DELAVAY in Szechwan and Yunnan provided an abundant supply of new and interesting species for elaboration by FRANCHET and his co-workers in Paris ; WILSON had already begun his journeys which were to result ultimately in the publication of *Plantae Wilsonianae*. But most of the evidence concerned only dried material in various herbaria, and the whole of the territory was almost virgin ground for the horticultural

explorer. The results of exploration work at various hands during the last thirty years have shown that the area embracing Yunnan and Szechwan contains possibly the finest alpine flora in the world. FORREST was thus most fortunate in his lot. He began with Yunnan, and in all his eight expeditions Yunnan was ever the centre. He made incursions into alpine Burma, S.E. Tibet, and S.W. Szechwan, but he never believed even at the end that he had secured all the floral treasures of his favourite province.

On his advent in 1904 Yunnan was no peaceful country. From 1904 to 1906 he had as much in the way of perilous adventure as a man of his type could desire. The Chinese were having one of their periodical disputes with the Tibetans, and the latter did not discriminate between Chinese and other foreigners, and were massacring Chinese and French missionaries with equal zest. FORREST was at Tzekou as a guest of Père DUBERNARD, a veteran of the French Mission. A party of eighty (including FORREST and his seventeen collectors and servants) had hurriedly to evacuate Tzekou and flee. Overtaken by the pursuing Tibetans, all were killed except a bare dozen. Père DUBERNARD was brutally tortured to death and a fellow-priest killed on the spot. Of FORREST'S personal following only one survived. FORREST had the good fortune to escape after a pursuit of some ten days without shelter and practically without food.

To this first expedition belongs also his venturesome tour with LITTON into the Upper Salween Valley among tribes who owed allegiance neither to China nor to Tibet. Two German explorers who repeated the journey a little later were killed by the same tribesmen. The subsequent expeditions of FORREST were not fraught with the same risks, as the country was relatively quiet—it was never quite free from disturbance. But FORREST'S personality contributed to good relations. He was soon on friendly terms with the Chinese, with the Tibetans, and with the tribesmen of many names. He took great interest in their life and manners, doctored them by his own methods, and helped them in many ways.

One cannot venture here on any account of his various journeys, but it is needful to give a survey of the general results. His collections from Yunnan in the way of botanical specimens number over 30,000, and form the most important contribution to the flora of that province ever likely to be made. On his earlier expeditions his choice was very general, but on other occasions he devoted special attention to trees and shrubs, and especially Rhododendron, while Primula was never forgotten. Gleaners in his field will not find much in the way of flowering plants which he failed to notice, except it be in those families, such as grasses and sedges, where the flowers are inconspicuous, or where they are natives of the warmer regions below 5,000 feet. Apart from mere numbers, the material is of the very highest standard, and each gathering is accompanied usually by very complete notes. The copiousness and choice of the material are as remarkable as the beautiful way in which it is dried. I must here cite the opinion of a Japanese botanist, Professor KUDO, who published recently, after

fifteen years' study, a monograph on the Labiatae of Eastern Asia. He visited over forty of the chief herbaria in Europe, Asia, and America, and states in his book that FORREST's specimens of Chinese plants are " die beste in der Welt."

It is of special interest to the members of this Society to know that for quantity and quality his Rhododendron collection is unique, and is easily the finest extant. FORREST was very devoted to the genus, and was ever hoping to find the " centre of the Rhododendron world." Whether there is such a place I gravely doubt—unless it is defined broadly as Western Yunnan. But FORREST's contribution to the genus is as his memorial, something " more lasting than bronze." Primula probably came next in his affections, and he made many notable additions to the known species.

I have already referred to some of the reasons which made FORREST so successful an explorer, but there are still some of his characteristics well worth recording. He shared very markedly in the attributes of the *naturalist* of the days before this era of specialization. His collections of mammals, birds, and insects have been overshadowed by his botanical finds, but they were noteworthy in their way, and he was much interested in securing them. He was full of information regarding the various peoples he came in contact with—their manners, customs, and pursuits. He knew much of the geological formations and minerals of the province, and his notes on plants generally included reference to the character of the soil. Long before it was admitted, he knew that many Rhododendrons would grow on limestone.

He was singularly successful in the training of the native collector. These hillmen became remarkably adept, and served the useful purpose of covering more ground than even his energetic self could hope to do. They were most loyal assistants. A cable from FORREST was enough to set them going, and on his arrival at Bhamo he was welcomed by men who had in some cases journeyed six weeks to meet him. His seed-collections consequently were on a generous scale. He was even reproached sometimes for too catholic a taste in his choice of plants. It is easy to prophesy after the event, and no easy matter for a collector in the wild to interpret horticultural value. There are many Gentians in Yunnan which rival *Gentiana sino-ornata*, but will they adapt themselves to our climate ? There are many Primulas there transcending *Primula malacoides*, but not one of them is likely to receive a similar welcome and attention from horticulturists throughout the world. There are glorious alpines on the cliffs of Yunnan such as *Isopyrum*, *Solms-Laubachia*, and *Lithospermum*, but have they been successfully introduced ? FORREST went on the principle of securing all he could, and so tried to satisfy both horticulturist and botanist. Members of the Society may be assured that from the scientific point of view the mass of material at different stages obtained by FORREST has proved of the utmost value in interpreting the many problems of their favourite genus.

FORREST had good powers of organization, and his explorations were carried out very methodically. He acquired a fair facility with that most difficult language, Chinese, and some acquaintance with hill

dialects. An enthusiastic photographer, he was the possessor of some thousands of illustrations of the country, its peoples, and its plants. His photographic records of alpines show conclusively that, much as he relied on his men for the detailed collecting, he never spared himself his full share of hard work on the highest cliffs and screes. Among the noteworthy Forrestian plants I can recall only one or two which he himself had not seen *in situ*.

He was well acquainted, as he had to be, with the written records of the discoveries of his predecessors, and was a persistent searcher after their more important and often elusive finds. One such, *Primula glacialis* from the Lichiang, cost him long and almost vain pursuit—the book-description was all he had to go by—and years after it was clear that he had secured it without its identity being realized at the time. The notes attached to his specimens are indicative at all times of keen observation, sound knowledge of the systematic position of each plant, and withal an eye for beauty.

It is a thousand pities that he could never be induced to write an account of his travels. The story of these last twenty-seven years would have been a fascinating one. Often spoken of, it was always postponed till his days of retirement—days which never arrived. The task did not appeal to him, and yet in his letters it was evident enough that he had the gift of narration. In many ways he was reserved and not a talker except in the company of his personal friends, and then he always held his own. Diffident of his powers of speech, he was not often persuaded to give a lecture. In his earlier attempts he was, in the parlance of the Scottish Church, a "reader," but in his later years he spoke with freedom and delighted large audiences, illustrating his story with numerous lantern slides taken from his own excellent photographs.

There was no mistaking the fine quality of the man and the evidence of power. He was in many ways a "bonny fechter." Sternly self-disciplined and eminently a man of his word, he was ever scrupulously anxious to do his best for those in whose interest he undertook his explorations. It is pleasing to record that in one of his last letters home he expressed himself satisfied with the spoils of 1931. *Ipsissima verba:* "I may with safety say that this will be the best year I have yet had. If all goes well, I shall have made a rather glorious and satisfactory finish to all my past years of labour." A true prophecy . . . but how gladly would his many friends have stayed the hands of fate, were it only for a little longer. *Ave et vale!*

"They told me, Heracleitus, they told me you were dead;
They brought me bitter news to hear and bitter tears to shed.
I wept, as I remembered, how often you and I
Had tired the sun with talking and sent him down the sky.
And now that thou art lying, my dear old Carian guest,
A handful of grey ashes, long, long ago at rest,
Still are they pleasant voices, thy nightingales, awake,
For Death, he taketh all away, but them he cannot take."
(From the Greek of Callimachus, *Trans.* W. Cory.)

[The foregoing appreciation of George Forrest and his great work of botanical exploration, which has so enriched our gardens, written by Professor Sir W. Wright Smith, V.M.H., is reprinted by kind permission from "The Rhododendron Society Notes," vol. iii. No. V.]

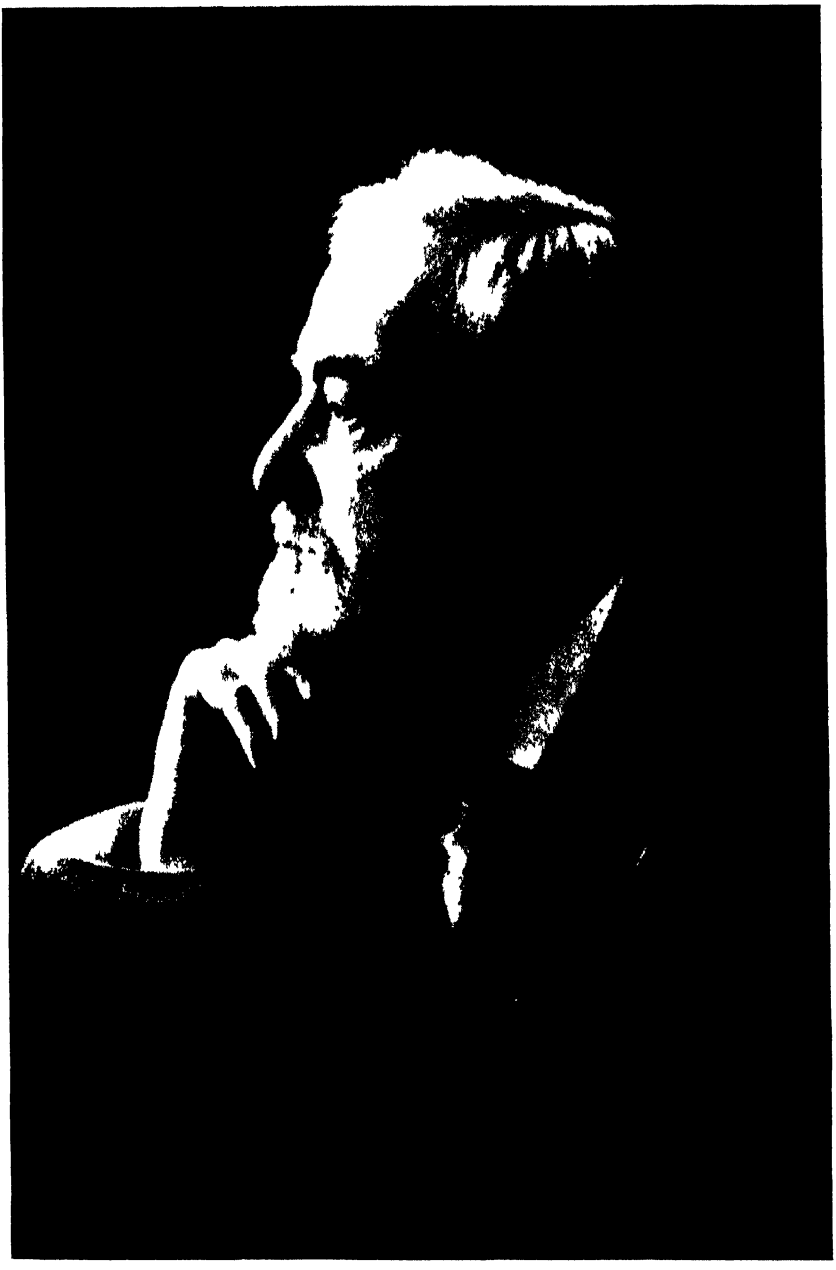


Fig. 122 The Hon Vicary Gibbs, V.M.H.
Vice President R.H.S.

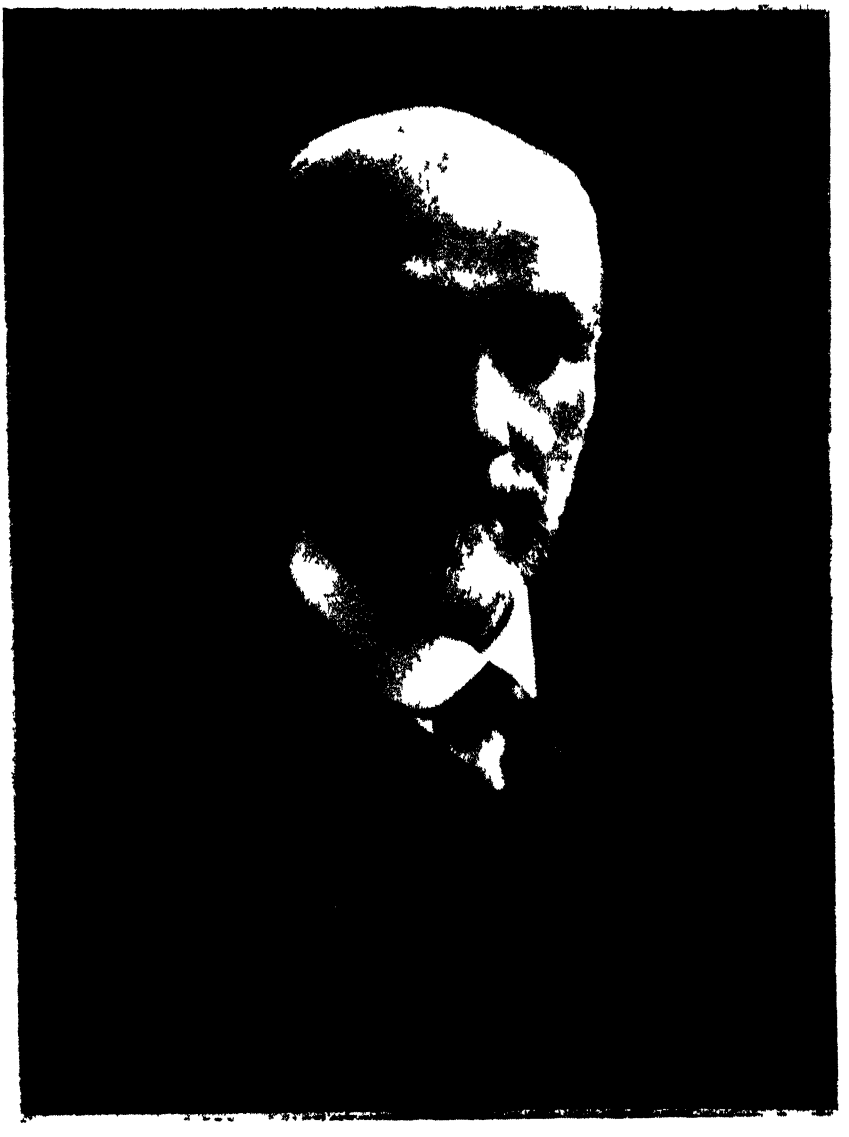


FIG. 123.—LEONARD GODHART SUTTON (BIRTH), VICE-PRESIDENT R.H.S.

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The Hon. Vicary Gibbs, V.M.H.
(1853–1932).

Leonard Goodhart Sutton, C.B.E., F.L.S.
(1863–1932).

It is our melancholy duty to record the death of two Vice-Presidents of our Society whose names are known and honoured wherever British horticulture flourishes.

The Hon. Vicary Gibbs, banker, author, sometime M.P., and member of the R.H.S. Council, had a life-long interest in trees and shrubs and formed at Aldenham, near Elstree, Herts, the finest and most comprehensive collection of hardy woody plants in this country. The papers he contributed to our Journal from time to time testify to his personal acquaintance with the individuals in that collection and to his great knowledge of all of them. From that garden came the wonderful exhibits of shrubs in flower and fruit that have amazed and interested so many at our shows—and not only of shrubs and trees, but of vegetables, as remarkable for their variety as for the excellence of their cultivation and display, which have formed such a feature at the Chelsea Show and other meetings of the Society. Scented Pelargoniums too held a foremost place in his affections, and more than once his great collection was exhibited in our Hall.

Leonard Goodhart Sutton's name is a familiar household word to all who grow flowers and vegetables from seed, for he was head of the great Reading firm of seedsmen. His interests were many—three times Mayor of Reading, President of the Council of Reading University, Chairman of the Berkshire Territorial Army Association—yet he found time to serve as Member of the Council of our Society and to play an active part in furthering the interests of Gardening Charities, and was elected a Vice-President on his retirement from the Council at the beginning of this year.

Flowers old rose.

OLD ROSE (Bath).—3½ feet, branched, with 16 closely set flowers, 3 out at a time; flowers 4 inches diameter, dull creamy old rose, middle of lower petals suffused rosy-magenta; margins somewhat wavy. Flowering from August 4.

Flowers orange-red.

AWARD.

Sir Lancelot, H.C. August 14, 1931. Raised and sent by Messrs. R. H. Bath, Wisbech.

SIR LANCELOT (Bath), **H.C.**—3½ feet, branched, with 16 to 18 closely set flowers, 4 out at a time; flowers 4 inches diameter, orange-red, flaked darker at the margins, middle of lower petals primrose blotched with scarlet. Flowering from August 4.

GAZELLE (Bath).—3 feet, branched, with 12 flowers, 4 out at a time; flower 3½ inches diameter, orange-red, margins darker, lower petals primrose, blotched red at middle. Flowering from July 25.

Flowers scarlet.

AWARDS.

Langport Victory, H.C. July 31, 1931. Raised and sent by Messrs. J. Kelway, Langport, Somerset.

Bonfire, H.C. July 31, 1931. Raised and sent by Messrs. W. J. Unwin.

LANGPORT VICTORY (Kelway), **H.C.**—3½ feet, branched, with 18 closely set flowers, 4 out at a time; flowers 3 inches diameter, rich scarlet, lower petal feathered with crimson. Flowering from July 20.

BONFIRE (Unwin), **H.C.**—3½ feet, branched, with 16 to 18 closely set flowers, 4 out at a time; flowers 3 inches diameter, brilliant deep scarlet, margins somewhat wavy. Flowering from July 13.

Flowers crimson.

NANCY (Holbrook).—3½ feet, branched with 18 very closely set flowers, 5 or 6 out at a time; flowers 3½ inches diameter, crimson, lower petals speckled with cream at the middle. Flowering from August 2.

Flowers lilac.

AMETHYSTINE (Holbrook).—Not vigorous, 3 feet, branched with 14 flowers, 3 out at a time; flowers 3½ inches diameter, dull greyish lilac, lower petals lined red; margins somewhat wavy. Flowering from August 12.

CLASS III.—**Large-flowered Type.**

Flowers white.

AWARD.

Hilde, H.C. August 14, 1931. Raised and sent by Messrs. Leopold Frietsch, Rastatt, Baden, Germany.

HILDE (Frietsch), **H.C.**—4 feet, branched, with 20 closely set flowers, 5 out at a time; flowers 5 inches diameter, white, middle of lower petals creamy. Flowering from August 8.

BETH (Holbrook).—3 feet, branched, with 18 very closely set flowers, 6 out at a time; flowers 4 inches diameter, white with occasional pink flakes. Flowering from July 22.

Flowers yellow.

AWARD.

Badische Flagge, A.M. August 14, 1931. Raised and sent by Messrs. L. Frietsch.

SCHMETTERLING (Frietsch).—4 feet, very vigorous, unbranched, with 18 closely set flowers, 4 out at a time; flowers 5 inches diameter, clear primrose, lower petal deeper and speckled with magenta; margins very wavy and frilled. Flowering from August 1.

BADISCHE FLAGGE (Frietsch), **A.M.**—4 feet, branched, with 20 closely set flowers, 5 out at a time; flowers 5 inches diameter, clear lemon, lower petals blotched with scarlet. Flowering from August 5.

ROI SOLEIL (Velthuys).—Not vigorous; 4 feet, branched, with 16 flowers, 5 or 6 out at a time; flowers 4 inches diameter, lemon-yellow, lower petal speckled with scarlet; somewhat hooded. Flowering from July 21.

Flowers pink.

AWARD.

Hymne, A.M. August 14, 1931. Raised and sent by Messrs. L. Frietsch.

BADEN (Frietsch).—4 feet, branched, with 18 closely set flowers, 5 out at a time, often arranged around the spike; flowers 5½ inches diameter, soft blush pink, lower petals flushed carmine at the throat. Flowering from August 14.

GARDEN LOVE (Velthuys).—4 feet, branched, with 18 closely set flowers, 3 or 4 out at a time, arranged around the spike; flowers 4½ inches diameter, soft cream-pink, substance somewhat soft. Flowering from July 18.

HYMNE (Frietsch), **A.M.**—4 feet, very vigorous, branched, with 18 to 20 closely set flowers, 6 out at a time; flowers 5 inches diameter, soft pinkish apricot. Flowering from August 14.

SUMMER BEAUTY (Velthuys).—Very vigorous; 3½ feet, branched, with 18 closely set flowers, 4 or 5 out at a time; flowers 4½ inches diameter, soft pink flaked with salmon; substance soft. Flowering from July 8.

Flowers salmon-orange.

AWARD.

Orange Blossom, H.C. July 31, 1931. Raised by Mr. C. P. Alkemade and sent by Messrs. Velthuys.

ORANGE BLOSSOM (Velthuys), **H.C.**—3 feet, branched, with 18 crowded flowers, 5 or 6 out at a time; flowers 5 inches diameter, rich salmon-orange, darker at the margins, lower petals broadly lined with magenta. Flowering from July 20.

DISTINCTION (Bath).—4 feet, much branched, with 16 closely set flowers, 4 out at a time; flowers 4½ inches diameter, rich salmon-orange, flaked darker at the margins, lower petals broadly lined with red. Flowering from July 30.

Flowers salmon.

AWARDS.

Mary, C. July 31, 1931. Raised and sent by Messrs. W. J. Unwin, Histon.

Frau Dr. Hanekuyk, C. August 14, 1931. Raised and sent by Messrs. L. Frietsch.

IMPERIAL ROSE (Kelway).—3½ feet, branched, with 18 closely set flowers, 4 out at a time; flowers 4½ inches diameter, soft salmon, lower petals speckled with salmon on cream; substance soft. Flowering from August 5.

BARON VAN WIJNBERGEN (Velthuys).—4 feet, branched, with 20 very closely set flowers, 6 or 7 at a time, around the spike; flowers 5½ inches diameter, soft salmon, margins darker, middle of lower petals lined magenta; substance soft. Flowering from July 25. Stock mixed.

MARY (Unwin), **C.**— 4 feet, branched, with 18 to 22 very closely set flowers, 6 out at a time; flowers, 4½ inches diameter, salmon, margins flaked darker, lower petal pale sulphur lined red at middle. Flowering from July 25.

OBERON (Frietsch).—4 feet, branched with 16 to 18 closely set flowers, 4 or 5 out at a time; flowers 5½ inches diameter, rich salmon, lower petal feathered with crimson; margins somewhat wavy. Flowering from August 1.

MODEL OF PERFECTION (Kelway).—Very vigorous; 4 feet, branched, with 24 very closely set flowers, around the spike, 4 out at a time; flowers 5½ inches diameter, bright salmon with blue flecks, lower petal creamy-white speckled with red; margins somewhat wavy; substance soft. Flowering from August 17.

FRAU DR. HANEKUYK (Frietsch), **C.**—4 feet, branched, with 20 closely set flowers, 5 out at a time; flowers 5½ inches diameter, bright clear salmon-carmine, lower petal blotched with crimson; margins somewhat wavy. Flowering from August 5.

Flowers cerise.

AWARD.

Impressive, A.M. August 14, 1931. Raised by Mr. C. P. Alkemade and sent by Messrs. K. Velthuys.

IMPRESSIVE (Velthuys), **A.M.**—Very vigorous; 4½ feet, branched, with 22 to 24 very closely set flowers, 4 or 5 out at a time; flowers 6 inches diameter, soft delicate cerise, lower petal white at the middle; margins somewhat wavy. Flowering from July 27.

Flowers rosy-red shaded lilac-mauve.

Tapestry (Kelway).—4 feet, branched, with 18 closely set flowers, 4 out at a time; flowers 4½ inches diameter, rosy-red, flaked and shaded dull lilac-mauve, lower petals lined and speckled rosy-red; substance soft. Flowering from August 5.

Flowers scarlet.

AWARD.

Jupiter, H.C. July 31, 1931. Raised by Mr. C. P. Alkemade and sent by Messrs. K. Velthuys.

JUPITER (Velthuys), **H.C.**—3½ feet, branched, with 12 to 16 closely set flowers, 4 or 5 out at a time; flowers 4½ inches diameter, rich scarlet, margins flaked darker, middle of lower petals pale cream speckled with red; margins of petals wavy. Flowering from July 25.

Flowers crimson.

AWARD.

Merkur, A.M. August 14, 1931. Raised and sent by Messrs. Leopold Frietsch

MERKUR (Frietsch), **A.M.**—Very vigorous; 4 feet, branched, with 16 to 20 closely set flowers, 5 out at a time; flowers 5 inches diameter, rich velvety crimson; margin of petals wavy. Flowering from August 8.

Flowers purple.

CLARION (Unwin).—3 feet, branched, with 14 closely set flowers, often arranged around the spike, 4 out at a time; flowers 4½ inches diameter, purplish-magenta, darker towards the margins, lower petals suffused with crimson at the middle; margins somewhat wavy. Flowering from July 20.

M. WITTELSBACH (Frietsch).—4 feet, branched, with 16 to 18 closely set flowers, 4 out at a time; flowers 5 inches diameter, royal purple, margins flaked darker and somewhat wavy, lower petal blotched with purple. Flowering from August 18.

NIXE (Frietsch).—3½ feet, branched, with 18 closely set flowers, 4 out at a time; flowers 4½ inches diameter, rich violet-purple self. Flowering from August 5.

BOOK REVIEWS.

"The Waste Products of Agriculture. Their Use as Humus." By Albert Howard and Yeshwant D. Wad. 8vo. xiv + 167 pp. (Oxford University Press, 1931.) 7*s*. 6*d*. net.

This important work, the final legacy left to India by the senior author after over a quarter of a century's fruitful labour directed to increased crop production in that country, describes the successful evolution, at the Indore Institute of Plant Industry, of a method for the systematic conversion of every kind of organic waste products of the farm into valuable humus. The first two chapters of the book review the general conditions and systems of agriculture as practised in the East for many centuries, contrasting them with the relatively recent methods developed in Europe and North America in the course of the last three or four hundred years. In the East we find a very dense population, both human and animal, living on minute holdings of two to twelve acres the fertility of which is maintained, without the aid of artificial manures, by means of a leguminous crop in the rotation and the return to the land of every scrap of organic material not required for food or fuel.

King, in his "Farmers of Forty Centuries," has described how the Chinese and Japanese farmers manufacture plant food-material from vegetable and animal wastes, the essence of the procedure being that the wastes are never dug into the soil but are composted outside. For raw waste material in the soil, by calling on the energies of the soil micro-organisms, depresses the yield, as has frequently been observed in the West when green manures are ploughed in. The soil in fact is overworked. The object of the investigations described in the book under review was to evolve a system for India based on the Chinese and Japanese practice of preparing humus outside the field. The investigations occupied three years and were completely successful.

The next two chapters deal with the sources of organic matter in the soil and the synthesis of humus, which is of vital importance as a habitat for micro-organisms whence they can obtain energy, nitrogen and minerals, for improving tilth and moisture-holding capacity, and for maintaining soil temperature and a suitable soil solution. When fresh organic matter is dug into the soil it is attacked by micro-organisms with evolution of carbon dioxide and disappearance of sugars, starches, celluloses and proteins. Lignine plus the synthesized substances constitute humus. The decomposition is fairly rapid provided that nitrogen and carbon are present in the ratio most favourable to the micro-organisms, viz. 1 : 30. The nitrogen must be taken

up from ammonium or nitrate compounds already formed in the soil, and it is this temporary withdrawal of nitrogen which may give rise to depression of crop yield. In humus the nitrogen to carbon ratio has risen to 1 : 10, and it is highly probable that it is a mixture of protoplasm of the decomposing fungi and other micro-organisms. In the second stage of decomposition, when the humus nitrogen is converted into ammonia and nitrate, the process goes on much more slowly.

By the Indore method the first stage (conversion of waste into humus) is carried out systematically and continuously throughout the year. The materials required, in addition to waste, were dung, urine-soaked earth from the cattle-sheds, wood-ashes from domestic and other fires, water and air. The waste is first withered and the more woody material crushed on the farm roads ; it is then thoroughly mixed with dung and urine earth, placed layer upon layer in pits 2 feet deep, each layer being watered with a sludge of wood ashes and urine earth. The charging may extend over about a week and the final height of the heap in each pit must not exceed 3 feet, otherwise air cannot penetrate. When once the heap is formed it must be regularly watered or decomposition will stop, since the fungi require a good deal of water. The pit is turned three times during the three months required for conversion to humus.

The output of humus from 300 acres was 1,000 loads ; each load cost 9½*d.* to produce and was equal in value as a fertilizer to three loads of ordinary manure. Briefly summarized, the main points in the Indore process are as follows : (i) Entirely aerobic : hence the limitation on the depth of the heap ; (ii) continuous supply of thoroughly mixed and thoroughly crushed waste having a C : N ratio of 30 : 1 (this ratio can be assured only by the incorporation of about one-third leguminous material) ; (iii) shelter from cooling winds, since cold arrests the activity of the fungi ; (iv) earth the weak bases of which exert a " buffering " effect and obviate the use of lime ; (v) ample water supply, so that the fermenting mass never becomes dry.

The book concludes with a chapter on the application of the process to other areas and indicates the main modifications which would be called for in Canada, the United States, and Great Britain. There seems to be little doubt that humus-making on a considerable scale is quite feasible in this country during the warmer half of the year.

In conclusion, we would specially commend this book to the attention of all who are interested in horticultural production, for it points a way by which independence of the farmyard may be reached.

" Plants : What they are and What they do." By A. C. Seward. xii + 41 pp. 8vo. (University Press, Cambridge, 1932.) 4*s.* 6*d.* net.

The author has given us here an elementary account of the way plants live, their relation to their environment, and their place in Nature's economy. Technical terms are few and well defined, and the book is one that can be read with advantage by any intelligent person who desires some knowledge of the living things of the world.

" Simple Fruit Growing." By P. K. Bear. 129 pp. Illustrated. (W. H. & C. Collingridge, Ltd., London, n.d.) 2*s.* 6*d.* net.

In this book the author sets out to tell in the plainest possible manner what the owner of a small or moderate-sized fruit garden must know to obtain best results from his trees and bushes and plants. All cultural operations are detailed in clear, simple fashion.

The chapter on Pruning and Spraying should be particularly helpful to the inexperienced gardener, and the advice given is plainly based upon practical experience and a knowledge of modern methods.

We are told that the author is a young man engaged in practical fruit-growing, and as a first book it is an exceedingly creditable effort.

The book deserved more careful proof reading than it has apparently received ; there are a few glaring errors of spelling and misprints—as when on page 64 the " hog manure " recommended should no doubt read " hop manure "—but apart from these shortcomings, the book is a worthy companion to others in the " Amateur Gardening " Simple Handbook Series, edited by A. J. Macself.

" Gardens and Gardening : the Studio Garden Annual." Ed. by F. A. Mercer. v + 122 pp. 4to. (Studio Limited, London, 1932.) 10*s.* 6*d.*

This is the first number of an annual designed to illustrate gardens and garden design. It contains articles on " The Country Garden," by P. W. D. Izzard ; " Town Gardens," by J. B. Vernon ; " Making a Rock Garden," by G. Whitelegg ; " The Cultivation of Sweet Peas," by J. W. Hitchcock ; " Annuals in the Modern Garden," by A. P. Balfour ; and three articles by C. Elliott, " Colour in the Garden," " Planting and Colour Guide," and " The Garden Calendar."

Judged as a garden annual, the treatment is unequal, and the most satisfactory chapter from this point of view is that on Annuals.

The great feature of the book is the illustrations of gardens and garden ornaments, and a careful study of these will repay all who desire to make a garden. They are from photographs and reproduced in half-tone blocks on glossy paper, making the book rather heavy, but they are well reproduced and show much detail as a rule.

A stranger to English gardens might, after looking through the book, think that stone played too great a part in English gardens, and if the illustrations really reflected these gardens this would be true, for very few scenes are depicted from which stone in some form is absent. This is merely another example of the somewhat unequal treatment which is evident elsewhere, and while it detracts from the book as a reflex of English gardens, it does not lessen the value of the pictures as examples of what is done in some of them.

" Lawns and Sports Greens." By A. J. Macself. x + 134 pp. 8vo. (Collingridge, London [1932].) 2*s.* 6*d.*

Much useful advice is given in this little book on the making and maintenance of grass lawns and playing-fields. We should like to see, however, more explicit information on the manuring of lawns, and the inclusion of some of the more recent results of experiments on the treatment of leather-jackets and the like.

" Garden Making by Example." By G. C. Taylor. vii + 130 pp. 8vo. (Country Life, London, 1932.) 10*s.* 6*d.* net.

About five-sixths of this book gives pictures or plans of gardens, the remainder notes on the way to lay out gardens. The advice given is generally sound. We are particularly pleased to see the author's warnings on the misuse of the pergola and hope a new edition will see more emphatic warnings against the use of *Cupressus macrocarpa* in unsuitable places.

" Cicatrisation et Régénération." By J. Millot. 8vo. 202 pp., 32 figs. (A. Colin, Paris, 1932.) 10f.50.

In his preface Professor Millot invites us to share again the wonder of the eminent French philosopher Réaumur, who wrote, two centuries ago :

> " Lorsque je vis pour la première fois deux polypes se former peu à peu de celui que j'avais coupé en deux, j'eus de la peine à en croire mes yeux, et c'est un fait que je ne m'accoutume point à voir après l'avoir vu et revu cent et cent fois."

Millot remarks :

" Ce qui émerveillait Réaumur au XVIII^e siècle n'a pas cessé d'émerveiller les savants et de passionner les profanes."

We would prefer to marvel, if that is the alternative !

In this little book the author deals with the regeneration of different animals, tracing out the morphological and physiological processes.

He pays little attention to plants—only one brief chapter is devoted to them, yet even the highest plants, unlike the more complex animals, possess the power of reproduction of a new co-ordinated individual from some small part of the parent plant.

Every gardener, therefore, could supply a list of marvels of regeneration from his experience in propagating from leaves, scale leaves, stems, roots, and other organs.

The little book proves to be an interesting zoological essay, written by an expert without much technical jargon.

" Recent Advances in Botany." By E. C. Barton-Wright, M.Sc. 8vo. 287 pp. (Churchill, London, 1932.) *12s. 6d.*

Two years ago the publishers issued a book by the same author—" Recent Advances in Plant Physiology," a review of which appeared in our JOURNAL for September 1930, p. 293. Whereas in the previous volume the author's subject was limited to one aspect of the science, in the present volume the subject-matter is not so closely related. In the preface it is stated that the cytological and genetical side of Botany, in which so much progress has recently been made, is left to other authors to deal with.

The first chapter is concerned with morphology and the work of Professor Bower on Size and Form is briefly summarized. Attention has already been drawn to these problems in a review of the original work " Size and Form in Plants " (this JOURNAL, January 1931, p. 149) ; the other morphological investigations concern the origin of the monocotyledon leaf and the theories suggested to explain its structure and the structure of the gynæceum of the flowering plants and the hypothesis suggested by Miss Sanders to explain the reduction of its parts. In reviewing the evidence for and against this hypothesis, the author freely quotes the opinions of others who consider that the ' carpel polymorphism ' hypothesis is based upon abnormalities and is therefore rather too sweeping.

Attention is next turned to fossil plants, and here the important advances in the technique by which the microscopic structure of fossil plants can be investigated is clearly detailed. A brief account of the Claytoniales is given. This family is of much interest to those searching for information concerning the very early history of the flowering plants. The remarkable plant-remains found at Gristhorpe are described with particular reference to their seed-like structure.

More interesting to the gardener perhaps will be the chapter dealing with the species concept, for every collector *must* classify, and gardeners must use them, even if they rather infrequently pause to consider the value of the differences separating one named entity from another. Turesson collected plants of the same species from different habitats and grew them together, and has been able to establish that in many species there are habitat races which breed true. Frequently similar ecotypes of other species are of much value in horticulture and agriculture.

The author, despite his preface in which he decides to omit cytology and genetics, considers the genetics of races of certain wild grasses in relation to their habitats and distribution. In this section, unfortunately, no mention is made of the major investigations undertaken at research stations, and by the larger seed firms, where extensive collections and breeding experiments have been made for many years now, and where the genetical basis of habitat races has been established. The author's remarks deal only with part of the work at Corstorphine. Unless he was prepared to consider the subject of ecotypes and agricultural and horticultural strains of plants in a broader manner, it would have been perhaps advisable to adhere even more closely to the preface ; for scant justice is done to plant breeding and applied ecology generally in its particular relationship to the species concept. Omissions are likely to occur in reviewing so wide a field in such a small compass, but such large omissions are somewhat unexpected.

The subsequent chapters deal with some of the simple fungi and with the red seaweeds. The physiology of mycorrhiza will prove of much interest to those horticulturists who are seeking to explain the failure of certain Lilies in various soils in terms of symbiotic activity. We find no mention of mycorrhiza in this genus in the review given here, and moreover, trenchant criticisms of the whole

hypothesis of mycorrhiza, based on a study of the heaths and elaborated by Rayner, are found in Knudson's and Christopher's work. In fact the theory that even the Ericaceae are obligate symbionts appears to be tottering before the physio-chemical attack.

Chapter IX on the virus diseases of plants forms an excellent introduction written by a practical worker in this field, and is to be recommended to growers of plants suffering from such complaints. Once again the necessity of team work in research is clearly demonstrated, for without the help of physiologist and entomologist, the pathologist could have made little progress. It is perhaps to be regretted that the author has been obliged to confine his remarks to virus work on plants, for no mention is made of the recent progress in research on virus diseases of animals. In this chapter (p. 242) the author again shows, as in his previous book, that he does not hesitate to criticize :—

> " Crinkle ' A ' is Murphy's cripkle or merely crinkle—nothing else, and to tag on the letter ' A ' will not help one iota in solving its nature."

The illustrations, some sixty in number, are all good. At the end of each chapter will be found a short selected list of references to the original work cited. There are very few misprints or similar errors in the text.

This book should prove very useful to senior botanical students and those desiring to know what the botanists of this generation are doing. It forms a suitable companion volume to the recent " Advances in Physiology."

" Soil Conditions and Plant Growth." By Sir E. John Russell. Sixth edition. pp. 636. 8vo. (Longmans Green, London, 1932.) 21*s.*

The new edition of this well-known work will be warmly welcomed by all those who derive their profit or pleasure from the growing of plants.

As Sir John Russell states in his preface, it is now twenty years since the first edition appeared as a more slender volume. In the interval the investigation of problems connected with the soil has been vigorously pursued in many institutions scattered throughout the world. More recently an international organization has developed which has already provided facilities for a freer interchange of knowledge. Its Russian conference afforded the author the opportunity of obtaining much first-hand information of the Russian soils and their reactions. This he has incorporated in the sixth edition, and one particularly valuable feature of this edition is that numerous references to the original publications are now more readily available.

More and more attention has been focussed during the last two decades upon the microbial population of the soil. No longer can a soil be considered merely as an inanimate physico-chemical complex supplying an adequate or inadequate amount of mineral salts to, and an anchorage for, our plants ; rather must we regard our soils as complicated federations of Lilliputian populations of extraordinary chemical activity. Any disturbance of the balance of power controlling the populations may produce surprising reactions : such disturbances are brought about by our cultural methods and by sterilization and other such practices.

A note has already appeared in this JOURNAL introducing a companion volume dealing with the physical properties of the soil ; it remains only to state that the chemical aspects are dealt with in a masterly manner.

Generally the book has not changed its form ; it shows, like its subject, true organic growth. It has long attained the distinguished appraisement of an invaluable standard work, and in its more mature condition, like good wine, needs no bush.

" Fertilizers and Food Production on Arable and Grass Land." By Sir Frederick Keeble, F.R.S. xi + 196 pp. 8vo. (University Press, Oxford, 1932.) 5*s.* net.

The present volume is one for the agriculturist in the main, though the horticulturist may learn much by inference, and the general reader interested in the welfare of his country will profit too. It deals with recent progress made in the application of manures to field crops and through them to the production of meat and milk, and it is written in the lucid style and convincing manner which we have learned to associate with Sir Frederick's pen.

" Garden Doubts and Difficulties." Compiled by H. A. Smith. ix + 130 pp. 8vo. (Collingridge, London, 1932.) 2*s.* 6*d.*

This is a series of replies to questions on almost every conceivable garden topic collected from the pages of " Amateur Gardening." Provided one can

translate the advice given into terms that apply to his particular case, the little book should prove of great value to anyone faced with difficulties in his garden—as who is not?

"A Biographical Index of Deceased British and Irish Botanists." By J. Britten and G. S. Boulger. Ed. 2. Revised by A. B. Rendle. xxii + 342 pp. 8vo. (Taylor & Francis, London, 1931.) 15*s*.

First published in 1893, three supplements followed in 1899, 1905, and 1908 respectively. These together totalled 256 pages, and the additions now made, bringing the biographies up to the end of 1928, increase the number of pages to 342. All the entries have been revised, and there are copious references to sources of information, lists of publications and so on, as well as an account of the work which has entitled its author to a place in a list of former British botanists.

Over two thousand persons are entered in this Index, and the work will be welcomed by all who take an interest in the study of plants and who desire to know who among British and Irish workers have contributed to our knowledge of them, and something of the persons whose names we find in books, on illustrations, in correspondence, and in herbaria.

The compilation has called for much painstaking work, and we are grateful to the reviser for bringing such an abundance of accurate information together between the pages of one volume and to the late Mr. James Britten, one of the original authors, who made it possible to do this by devising a sum of money to be used towards the cost of printing it.

"The Gardens of England and Wales, open to the Public in aid of the Queen's Institute of District Nursing." Introd. by C. Hussey. (Country Life, London, 1932). Paper covers. 1*s*. net.

Lady Georgiana Muir with her helpers has arranged a long list of gardens open to the public on occasion in aid of the Queen's Institute of District Nursing, and this little book, which illustrates many of them, will be an additional means of encouraging people fortunate enough to be in the neighbourhood of these gardens to visit them, and of helping on a very worthy cause.

"An Introduction to the Scientific Study of the Soil." By Professor N. M. Comber. 2nd Ed. 8vo. 208 pp. (Arnold, London, 1932.) 7*s*. 6*d*. net.

Professor Comber's name is so well-known is connexion with soil science that it is not surprising that a second edition of his book has been called for. The new edition adds some twenty pages to the original and includes a desirable expansion of the section dealing with the organic matter in soils, inasmuch as it now embraces an account of the micro-organisms in the soil and their work.

The book is one essentially intended for students, and in it they should find the latest information—gathered from a wide field—on the researches of soil scientists both in this country and elsewhere. In this the views of the Russian school and their suggestion of soil-classification have been largely drawn upon and to a great measure adopted, though of much of this it must be said that it has hardly got beyond the initial stages.

As a general survey of the present condition of soil-science, Professor Comber's treatise is full of information, perhaps rather closely-packed, but well-arranged. In succession, the relations of plant life to soil, the consideration of the mineral and organic constituents of soils, and the formation of soils are dealt with. After this follow descriptions of soil particles and soil water, and then an account of the outside influences, such as temperature, air, water, etc., which play their part in the taking up of food by the plant from the soil and in the removal of soil constituents by drainage.

The assimilation of nitrogen is specially dealt with, as also the losses of nitrogen to the soil, the work of organisms in this connexion being rightly set out.

Then follows an account of the mineral plant food in soils, and this may not improbably strike the reader as the least satisfactory part of the book, and as hardly adequate to its importance.

A chapter on the classification of soils, with special reference to the Russian system mentioned above, concludes the work.

The book, as already stated, is essentially one for the student, and presupposes more than a general knowledge of chemistry and physics; hence it will be found to be beyond the scope of the general reader, and be of little guidance to the horticulturist unless he be well versed in the sciences named.

If a criticism be allowed of a work which contains—and in small compass—so much information useful to the student, it would be that there is throughout but slight reference to the bearing of research on actual agricultural practice. This aspect might well have been emphasized, as, after all, a science should not be studied purely as an abstract one, but in its relation also to practical ends. This applies very specially to soil-science, and it must be admitted that the tendency of workers in this branch at the present time is to lose sight of the connexion with agricultural practice.

It would further seem desirable, even for the student's use, that some preliminary account of acidity in soils should precede the reading of p. 120, in which he will find himself plunged into the mysteries of " pH value " without having been told what this indicates.

In a work of the size of the present one there is no intention, of course, of dealing with the chemical analysis of soils, but its dismissal in eight lines hardly does justice to it. And, indeed, the whole of Chapter XIV, which includes such varied subjects as drainage, ploughing, rolling, fallowing, liming, and manuring as well as methods of field and pot-culture experimentation and chemical and mechanical analysis of soils—about each of which a great deal could with advantage be said—might well have been omitted, for the treatment of each is manifestly inadequate, as seen by the fact that they are all disposed of within the limits of twelve pages.

" Plant Physiology—with Reference to the Green Plant." By E. C. Miller, Ph.D. 8vo. 900 pp. (The McGraw-Hill Publishing Co., Ltd., 1931.) 35s. net.

Special monographs dealing with certain aspects of Plant Physiology, such as Photosynthesis, Transpiration, and Permeability, have recently been published by English writers, but for many years British botanists have been indebted to the Continental workers for standard texts on Plant Physiology—Jost's, Czapek's, and Palladin's books being familiar to all students. Recently two textbooks have been published, in the familiar format, by the McGraw-Hill Company. The larger one by Miller is designed as a standard work of reference.

Such a book will therefore make its appeal to the more serious student and to the research worker; but to all interested in plants this book is to be recommended as an introduction to the modern literature of Plant Physiology, for the author has brought together inside the covers of one volume a tremendous mass of information; particularly the more recent English and American work has been dealt with.

The text is not an exceptionally easy one to read, for although the writing and meaning are always clear, the necessary constant citations and references tend to break the continuity of the argument. The author does not hesitate to quote the opinion of the worker he mentions, but in many instances the reader would also welcome a judicial summing-up of the present position by the author at the end of his chapter.

The range of work is adequate, and in such a wide field it is, of course, only to be expected that the topics lying nearer to the author's own investigations receive slightly more ample treatment than others with which he is personally less familiar, but no topic is dealt with in a superficial manner.

In the reviewer's opinion it is doubtful whether the inclusion of some 700 questions at the end of the chapters is a feature worthy of the work as a whole. These questions can only be of value to a limited number of students.

Compared with most American textbooks there are few illustrations. The indexing has been carefully carried out, so that the thousands of references are not only grouped under the topics with which they deal, but are also listed by " author." The value of the book, which far exceeds its price, and that is not particularly low, lies in the references to literature which has come under review.

" Advice on the Pruning of Roadside and Street Trees." By The Roads Beautifying Association. 8vo. 12 pp. (Roads Beautifying Association, London, 1931.) Paper boards, 1s.

One word will suffice to recommend this little pamphlet to all concerned with street trees. It is: " Excellent."

" Mesembryanthema: Descriptions with Chapters on Cultivation and General Ecology." By N. E. Brown, A. Tischer, and M. C. Karsten. Ed. by E. J. Labarre. In English, German, and Dutch. Square 8vo. xxvi + 323 pp. (Reeve, Ashford, 1931.) 36s. net.

Mesembryanthemums are desert and rock plants of South and South-west Africa, and their quaint forms—sometimes resembling stones—and bright

flowers, as well as the power so many species have of passing long periods without water and without damage, have made many of them favourite pot-plants in temperate countries and favourite rock plants in countries with a hot, dry summer and not too steamy a rainy season.

Their nomenclature has, however, been a puzzle, for in many instances adequate descriptions were wanting, and even when available they were not always easy to understand.

The illustrations in this book will remedy this, for they are excellent for the purpose, and there are over one hundred and sixty of them from photographs as well as two plates each containing several species in colour.

The cultivation of Mesembryanthemums in this country has not yet attained anything approaching the extent which it has reached on the Continent, but the chapter in this book on the way to treat them will help to remedy that, for it is clear and written out of ripe experience.

The text is in three languages, English, German, and Dutch, and the book will therefore appeal to a wide public in England, South Africa, and the Continent—a public, too, widely interested in plants and their cultivation.

The text has been a long time in preparation, for Mr. Brown's foreword is dated 1928, but this is not surprising, for not only has time been consumed in translation, but a very large number of persons have been laid under contribution for information and photographs, and the result is a very useful book, dealing with a fascinating group of plants.

Doubtless there will be discussions upon the nomenclature adopted, but at any rate we have at last a means of getting at names by which we may call our specimens of this group, which can be recognized, if by no other means, through the excellent photographs that form such a feature of the book.

" The Curious Gardener." By " Jason Hill." 8vo. 173 pp. (Faber & Faber, London, 1932.) *7s. 6d.* net.

This is a book of great interest, whose quality may best be indicated by saying that it much resembles both in matter and manner some of the chapters of Mr. E. A. Bowles' evergreen " My Garden in Spring," etc.

Were it not for certain other indications one might almost imagine that the curious gardener himself lived at Enfield, but this is obviously ruled out, and we will leave the author, as he wishes it, veiled with the leaves of his anonymity. A few pages reveal the fact that he is a scholar and a very practical gardener with personal tastes—a figure to be cherished in a day when too few gardeners take a line of their own. Who before has given a chapter to Elders and Periwinkles ? This association, like many of his plant preferences, is determined by a delight in a good line. A well-drawn plant, if one may so phrase it, has an attraction which makes it worth while even when lacking colour and scent.

The author very happily notes that Durer was pleased to include the Sea Holly in one of his pictures ; " its sharp, intricate design might have been one of his own inventions."

This is a good sample of one of the numerous and attractive hares the author raises which tempt the reviewer to the chase. If Durer should have designed the Sea Holly, surely Beardsley must have had a hand in the lines of *Iris Korolkowi*, and who but Heath Robinson could have thought of the ' Candle Plant,' *Kleinia articulata* ?

What too, he asks, will be the outcome of the revival of interest in the Baroque should it spread beyond Bloomsbury ? We have seen already the influence of the Russian ballet upon our gardens. Who would have planted Venidiums but for the valuable advance advertising of the ' Coque d'Or,' where gigantic Sunflowers brought kings and their courts to the stature of pygmies ?

But from such airy flights we must return.

A chapter on fastigiate trees calls attention to their value in gardens to break up the rounded curves of tree outline and to lead from the vertical lines of the house to the horizontals of the borders. To the author's list the reviewer would add *Cupressus Lawsoniana* var. *Pottinsii*, whose silver-feathered columns are so admirable in the middle distance.

Some fresh ideas are expressed in Chapter V upon miniature landscapes and sand gardens, where seaside plants may have their home.

In Chapter VII, " The Invisible Garden," the author deals with scents of flower and leaf in a masterly way, and pleads for the higher education of the nose, " The Cinderella of the Senses." How many have grown *Lathyrus tuberosus* for its odour, or noticed that the excellent Rose ' Dr. W. van Fleet ' has a Sweetbriar scent ; that *Herminum monorchis* smells like a William Pear, and *Ribes*

aureum is worth a place for its fragrance? These pages are worth careful reading and will probably bring an added charm to many gardens.

In a chapter on Cacti the author discusses the reason for the awakened interest in these plants. Can it be that Corbusier and the modern school of Engineers calling themselves Architects are really responsible for this prickly renaissance? We hardly think so. The effect of the week-end habit of gardening and the influence of the Cubists cannot lightly be disregarded. Perhaps, too, in a world where Speed has its Kings, and Movies their Palaces, there may be, to many, a quiet pleasure in the Buddah-like immobility of the Cactus.

With all the other subjects so happily discussed we have not space to deal, but record our thanks for a valuable and stimulating book, chatty but not garrulous, wise but not ponderous, excellently printed and produced, and adorned with woodcuts from the individual pencil of John Nash.

Over two centuries ago a certain John Cowell published his "Curious and Profitable Gardener." "Jason Hill" might well have repeated the second adjective.

"Chromosomes and Plant-breeding." By C. D. Darlington. Foreword by Sir D. Hall. xiv + 112 pp. 8vo. (Macmillan, London, 1932.) 7*s.* 6*d.* net.

A brief account of the series of steps which have led up to the position taken by the author—that all, or nearly all, the phenomena observed in the study of heredity have their bases in the chromosomes and are connected with the behaviour of the chromosomes—is written in Sir Daniel Hall's usual lucid, easy style.

The book itself, which is based upon a series of articles by the author which appeared in the *Gardeners' Chronicle*, deals with the phenomena of genetics and relates them to the observed facts of chromosome division and arrangement within the nucleus of the cell.

The account given is clear when once one has grasped the meaning of the many new terms which this new study has added to the vocabulary of the investigator of heredity, and an excellent case is made out for most of the views put forward. Some will no doubt be modified in the light of further knowledge and some are unconvincing—as for instance the note on self-sterility on p. 101.

It is of course important to remember that to the fruit-grower, self-sterility means something different from the strict meaning attached to the phrase by the plant-breeder.

Before one accepts the whole of the implications of the chromosome theory, the peculiarities of gall-formation might well be considered.

"Soils: their Origin, Constitution, and Classification: an Introduction to Pedology." By G. W. Robinson. xv + 383 pp. 8vo. (Murby, London, 1932.) 20*s.* net.

Pedology is the study of the soil from the standpoint and by the methods of pure science—it involves the threefold investigation of the processes of weathering and denudation, of the physical and chemical properties of the results of those processes, and of the complex flora and fauna in relation to the soil environment provided.

All these aspects are treated of, so far as possible in a comparatively short account, and the result should be of interest, particularly to those who are interested in the soil as a study in itself. Others who are mainly interested in the soil from the point of view of what it will produce, or from the light its composition throws on the distribution of plants or the changes brought about in geological time, are less particularly catered for, but they are not neglected.

Such a book is not likely to be easy reading, for the number of technical terms considered necessary is very great: *e.g.* "In clays of this class, it may be supposed that minerals of the siliceous montmorillonite-bentonite type are present. . . . It would be of particular interest to ascertain if the removal of sesquioxides in podsolisation and solotisation leads to the formation of new minerals." And so on.

"Culpeper's English Physician and Complete Herbal." By W. J. Ferrier. 139 pp. Oblong 8vo. (Foyle, London, 1932.) 5*s.* net.

Much of Culpeper remains in this new revision, but the plants mentioned by him have been named according to present usage and arranged in their Natural Orders. The herbal is "improved, with corrections," as the sub-title tells us.

H.R.H. The Princess Louise has written a foreword, and the author a note on Culpeper's life. The plants are all illustrated by drawings which represent them very well, adapted from the plates in Woodville's "Medical Botany."

The quaintness of Culpeper's language and his directness have been preserved, and they are characters which, quite apart from any other merits, will keep his among the desirable English books. While the original is curtailed to some extent in this edition, nothing of its essence is lost.

"Gay Gardens from Seed." By S. Baker Williams. Ed. by A. J. Macself. 8vo. x + 134 pp. (Collingridge, London [1932].) 2*s*. 6*d*. net.

A book on the raising, treatment, and use of annuals and biennials, and one that should help to bring these useful plants to a better appreciation and cultivation than they too often receive. It is a pity that some of the newer annuals, like species of Venidium and Ursinia, are not referred to, for in a new book one might look for a word of praise or condemnation of some of these newer things.

The final chapter gives tables of sowing dates, flowering times and distances for planting and so on, but here again one will find gaps. *E.g.*, though Antirrhinums are treated as annuals or biennials in the body of the book, they find no place in the tables.

In spite of these faults we still have a very useful little book, which will help many to obtain greater results from their labour and their care, and, indeed, to furnish a garden with annuals alone.

NOTES AND ABSTRACTS.

[For Index of Periodicals quoted see previous volumes.]

Beet nematodes in Scania (Några erfarenheter angående betnematodernas utbredning i Skåne). By J. Rasmusson (*Sver. Utsäd. Tidskrift*, 1929).—Opportunities for the great increase of the beetroot eelworm (*Heterodera schachtii*) had occurred in many fields, but it was found to remain local in its distribution and mild in the damage done. It is concluded that it is unlikely to prove a serious menace to beet and other plants in the area considered.—*F. J. C.*

Bulbs, Experiments with, Report for 1931 (*Agric. Inst. and Expt. Sta., Kirton, Lincs.*; March 1932).—The method of experiment and the first year's results are reported, the findings being briefly as follows: (i) Effect of planting various-sized bulbs. *Narcissi*: small offshoots gave fewer flowering bulbs than large offshoots, and these a smaller proportion of double-nosed bulbs than single-nosed plantings. *Tulips*: results not quite so clear-cut but greatest proportional increase in weight was given by small plantings of 7 cm. diameter, greatest number of largest bulbs given by plantings of 9 and 10 cm. diameter. (ii) Effect of date of planting on bulb development. *Narcissi*: early (September) planting gave greatest increase in weight and bulb size. (iii) Effect of cutting and not cutting flowers of *Tulips* on bulb development. The cutting of the flowers for market (without damage to leaves) resulted in deterioration of bulbs. (iv) Effect of depth of planting *Tulips* on bulb production. Planting 3 inches deep resulted in higher production than at 5 inches and that than at 7 inches. (v) Ordinary v. warm storage of *Tulips* resulted in very little difference in flowering time and bulb production though initial growth was delayed (but those kept in ordinary store were planted in mid-September, 1930, those kept at 67.5° F. in mid-October). (vi) Production of large *Hyacinth* bulbs. Satisfactory increase in weight and considerable increase in size were obtained.—*F. J. C.*

Cabbage × Savoy Cabbage, Results from a Cross. By J. Rasmusson (*Hereditas*, **16**, pp. 241–248; 1932).—The cross between Savoy and Cabbage resulted in F_1 with crinkled leaves and waxy covering intermediate between the cabbage and savoy used, with hearts also intermediate. The best of the F_1 generation were selfed and grown on. About 10 of the 780 resulting plants showed no wrinkling; there was great variation in the flavour but none had so accentuated a flavour as the original cabbage parent. A storm destroyed all but three of the F_2 plants, and from 278 selfed flowers only six seeds resulted, five of which germinated, all the plants were abnormal, and all soon died. The crossed seeds gave good results and produced plants intermediate between the two original parents, giving a race no more heterogeneous than is usual in cabbages.
F. J. C.

Ceanothus Fendleri A. Gray. By O. Stapf (*Bot. Mag.*, t. 9264; Feb. 1932).—Shrub from Arizona, New Mexico, etc., dwarf, spiny, downy; flowers numerous white or flushed mauve in fascicles grouped into a rather long thyrse. Somewhat tender.—*F. J. C.*

Celery Leaf-spot [La septoriose (rouille) du Céleri et le *Septoria Petroselini* Desm. var. *Apii* Br. et Car.]. By C. Baehni (*Univ. Genève. Fac. des Sci. Thesis* 916, 1932).—The author finds that the roots of seedling celery are liable to be attacked by the fungus *Septoria Petroselini* var. *Apii* when the "seeds" are infected, and the fungus then invades the aerial parts of the plant. He finds steeping the seed in a solution of 10 grammes calcium hypochlorite, 150 c.c. water, using the clear watery part only, for 3 hours, an effective means of destroying the infection carried in the seed.—*F. J. C.*

Cycnoches Egertonianum Bateman. By V. S. Summerhayes (*Bot. Mag.*, t. 9260; Feb. 1932).—*Cycnoches Egertonianum* and *C. Rossianum* are considered conspecific. The male flowers (deep purple and yellow with a greenish base to the segments) are figured. Native of Central America and a plant for a hanging basket.—*F. J. C.*

Kalmiopsis, a new Genus of Ericaceae from North-West America. By A. Rehder (*Journ. Arnold Arb.*, 18, pp. 30–34 (1932); plate).—A plant discovered in Oregon recently and first described as *Rhododendron Leachianum* is regarded by Dr. Rehder as related rather to Kalmia and Loiseleuria and he forms the genus Kalmiopsis to contain it. *Kalmiopsis Leachiana* occurs only in the Siskiyous near other plants isolated from their congeners. It bears rose, widely bell-shaped flowers and forms an erect shrub about 6 to 9 inches high.—*F. J. C.*

Mosaic Type, Analysis and Synthesis of some diseases of. The Problem of Carriers and Auto-infection in the Potato. By R. N. Salaman (*Proc. Roy. Soc.*, B, 110, pp. 186–224; plates).—A third virus has been discovered in diseased potatos, and an account of the reaction of potatos to the three known viruses acting alone is given. The symptoms produced differ according to the complexes of these viruses present. The addition of a virus element to a pre-existing virus complex may bring about a condition in which no clinical reaction occurs, and the plant behaves as a carrier. " Cell-inclusions " are found in the presence of the " X " virus, but not in its absence.—*F. J. C.*

Primula Dubernardiana Forrest. By O. Stapf (*Bot. Mag.*, t. 9266; Feb. 1932).—Synonymous with *P. Monbeigii*, belonging to the group containing *P. Forrestii*, but dwarf, woody at the base, reddish-purple in flower, and with short scapes. Introduced by G. Forrest from S.W. China. Not very hardy. *F. J. C.*

Rhododendron sanguineum Franch. By O. Stapf (*Bot. Mag.*, t. 9263; Feb. 1932).—*R. haemuleum* Balf. f. et Forr. is regarded as a synonym of this species, which is a small shrub bearing 2-inch dark green leaves crowded at the ends of the branches, densely grey-haired on the under surface. Flowers campanulate, crimson to dark red. Native of Yunnan and Tibet at 12,000–13,000 ft. alt. in open moist moorland. Hardy.—*F. J. C.*

Schizophragma viburnoides Stapf (*Bot. Mag.*, t. 9262; Feb. 1932).—A climber from Central and South-eastern China, Formosa and the Luchu Archipelago, as stated under the paragraph " Distribution," but according to the text found also in the Khasia Hills in India. This plant was first described as *Pilostegia viburnoides*, but is now transferred to *Schizophragma*, from typical species of which it differs only in the absence of " semaphore leaves " in the inflorescence. It is characterized by long, lanceolate, glabrous, dark green leaves and small green flowers in large cymes.—*F. J. C.*

Sedum, The Genus: a systematic essay. By H. Fröderström (*Acta Horti Gothoburgensis. Appendix*, vols. v–vii, 1930–32, pp. 1–126; plates).—All species of Sedum are described in this monograph in Latin, with notes in English. Each species is illustrated by line drawings and by photographs of herbarium specimens. Some new species are described.—*F. J. C.*

Selago serrata Bergius. By O. Stapf (*Bot. Mag.*, t. 9265; Feb. 1932).—A glabrous, evergreen small shrub with stiff branches and numerous, crowded, sessile, dentate leaves. Flowers purple violet in dense heads over 2 inches in diameter. S.W. Cape Province, and the most showy Selago wild around Cape Town. Introduced by Masson in 1774.—*F. J. C.*

Watsonia Wordsworthiana Mathews & L. Bolus. By O. Stapf (*Bot. Mag.*, t. 9261; Feb. 1932).—Bright rose with long, curved tube, arched stamens and longer bracts than in *W. Ardernei*. Hardy in sheltered places, from the Tulbagh division of the Cape Province.—*F. J. C.*

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

MARCH 10, 1931.

Dr. A. B. RENDLE, F.R.S., M.A., D.Sc., F.L.S., V.M.H., in the Chair.

A lecture was given by Miss I. W. Hutchison, on "Greenland's Flowery Valleys" (see p. 21).

MARCH 24, 1931

SEWELL MEDAL COMPETITIONS.

The Sewell Medal for the best exhibit of six pots or pans of plants suitable for the rock garden or alpine house.

Amateur Growers.

To Mark Fenwick, Esq., J.P., Abbotswood, Stow-on-the-Wold, Glos.

Trade Growers.

To Messrs. Clarence Elliott, Stevenage.

APRIL 8, 1931.

Sir DANIEL HALL, K.C.B., F.R.S., Sc.D., M.A., LL.D., in the Chair.

The first Masters' Memorial Lecture was given by Professor Dr. Baur, on 'New Scopes and New Methods of Plant Breeding" (see vol. **56**, p. 176).

APRIL 9, 1931.

Sir FREDERICK KEEBLE, C.B.E., F.R.S., M.A., Sc.D., in the Chair.

The second Masters' Memorial Lecture was given by Professor Dr. Baur, on 'The Problem of Evolution" (see vol. **56**, p. 183.)

APRIL 14, 1931.

DAFFODIL SHOW.

CHIEF AWARDS IN THE COMPETITIVE CLASSES.

The Engleheart Challenge Cup and a Silver-gilt Lindley Medal, for twelve varieties of Daffodils raised by the exhibitor.

To Mr. J. S. Arkwright, M.A., D.L., J.P., Kinsham Court, Presteign.

Silver-gilt Banksian Medal, for twelve varieties of Daffodils not in commerce.

To Mr. J. L. Richardson, Prospect Gardens, Waterford.

APRIL 27, 1931.

Mr. E. A. BOWLES, M.A., F.L.S., F.E.S., V.M.H., in the Chair.

A lecture was given by Mr. A. Worsley, J.P., on "The Genus *Amaryllis*, including its bi-generic and other hybrids and crosses" (see p. 8.)

MAY 5, 1931.

Mr. R. D. Trotter in the Chair.

A lecture was given by Mr. E. A. Bowles, M.A., F.L.S., F.E.S., V.M.H., on "Plants in Season."

CHELSEA SHOW.

MAY 20–22, 1931.

Held in the Royal Hospital Gardens, Chelsea.

The following accepted the Council's invitation to assist in judging the exhibits:—

BAKER, G. P.
BAKER, W. G.
BALFOUR, F. R. S., M.A., D.L., J.P., V.M.H.
BARNES, N. F., V.M.H.
BEAN, W. J., I.S.O., V.M.H.
BECKETT, E., V.M.H.
BEDFORD, A.
BENNETT, W.
BILNEY, W. A., J.P., V.M.H.
BOWLES, E. A., M.A., F.L.S., F.E.S., V.M.H.
BOSCAWEN, Rev. A. T., M.A., V.M.H.
BRIDGEFORD, J. M.
BRUNTON, J. S.
CHURCHER, Major GEORGE
COMBER, J.
COOK, T. H.
CORY, R., F.L.S.
COUTTS, J.
CRANFIELD, W. B., F.L.S.
CURTIS, C. H., F.L.S., V.M.H.
FENWICK, MARK, J.P.
GALSWORTHY, F.
HALL, R. H.
HARROW, R. L., V.M.H.
HEADFORT, The Marquess of
HUMPHRIES, W.
INGAMELLS, D.
IRVING, W.
JEFFREY, J. T.
JORDAN, F., V.M.H.
LAWRENCE, Sir William, Bt., V.M.H.
METCALFE, A. W.
MOORE, Dr. F. CRAVEN
OLDHAM, W. R., J.P.
PAGE, W. H.
PATEMAN, T.
PILKINGTON, G. L.
PRESTON, F. G.
PUDDLE, F. C.
ROTHSCHILD, L. DE, O.B.E., V.M.H.
SMITH, H.
STEVENSON, T.
TAYLOR, G. M.
TAYLOR, T. W.
TIPPING, H. AVRAY
WETTERN, H. L.
WILLIAMS, C., M.P.
WILLMOTT, Miss E., F.L.S., V.M.H.

LIST OF AWARDS.

Silver Cup presented by The Horticultural Society of New York, for the most meritorious exhibit in the Show.

To Messrs. Sutton, Reading, for Flowering Plants from Seeds.

Cain Cup, for the best exhibit shown by an amateur.

To Lady Aberconway and the Hon. H. D. McLaren, Bodnant, N. Wales, for some less common Plants (gr. Mr. F. C. Puddle).

Orchid Challenge Cup, for the best group of Orchids shown by an amateur in a space not exceeding 100 sq. ft.

To F. J. Hanbury, Esq., East Grinstead (Orchid grower, Mr. S. Farnes).

Orchid Challenge Cup, for the best group of Orchids shown by an amateur in a space not exceeding 60 sq. ft.

To C. G. Osborne, Esq., Marlow (gr. Mr. J. E. Jones).

Orchid Trophy, for the best twelve Orchids exhibited by an amateur.

To E. R. Ashton, Esq., Tunbridge Wells (gr. Mr. C. V. Kent).

Gold Medal.

To Mr. G. G. Whitelegg, Chislehurst, for rock garden.
To Messrs. G. Bunyard, Maidstone, for Apples.
To Messrs. R. Bolton, Birdbrook, for Sweet Peas.
To Messrs. Allwood, Haywards Heath, for Carnations, Pinks and Dianthus Hybrids.

To Messrs. C. Engelmann, Saffron Walden, for Carnations.
To Messrs. L. R. Russell, Richmond, for Stove and Greenhouse plants.
To Messrs. H. G. Alexander, Tetbury, for Orchids.
To Messrs. Armstrong & Brown, Tunbridge Wells, for Orchids.
To Sir Jeremiah Colman, Bt., Reigate, for Orchids (Orchid grower, Mr. B. F. Perfect).
To Messrs. McBean, Cooksbridge, for Orchids.
To L. de Rothschild, Esq., Exbury, for Orchids (Orchid grower, Mr. B. Hills).
To Baron Bruno Schröder, Englefield Green, for Orchids (Orchid grower, Mr. J. E. Shill).
To Messrs. Alex. Dickson, Newtownards, for Roses.
To Messrs. Barr, Covent Garden, for Tulips.
To Lady Aberconway and the Hon. H. D. McLaren, Bodnant, N. Wales, for some less common plants.
To Carters' Tested Seeds, for Florists' Flowers, Sweet Peas and other Annuals.
To Messrs. Sutton, Reading, for Flowering plants from seeds.
To Mr. Amos Perry, for mixed group of Hardy Ferns, Herbaceous, Bulbous, Bog and Aquatic Plants.
To Messrs. R. Wallace, Tunbridge Wells, for mixed group of Rhododendrons, Lilies, and other Bulbous Plants, Primulas, Japanese Maples, Japanese Tree Pæonies and Irises.

Silver Cup.

To Messrs. Pulham, Newman St., W., for rock garden.
To Messrs. Clarence Elliott, Stevenage, for rock garden.
To Messrs. J. Waterer, Sons & Crisp, Bagshot, for Rhododendrons.
To Messrs. Laxton, Bedford, for Strawberries.
To Messrs. Dobbie, Edinburgh, for Sweet Peas.
To Messrs. Blackmore & Langdon, Bath, for Begonias.
To Baron Bruno Schröder, Englefield Green, for *Clerodendron fallax*, Hippeastrums, etc.
To Messrs. Charlesworth, Haywards Heath, for Orchids.
To Messrs. Ben. R. Cant, Colchester, for Roses.
To Messrs. Blackmore & Langdon, Bath, for Delphiniums.
To Messrs. Hewitt, Solihull, for Delphiniums.
To Messrs. Hillier, Winchester, for trees and shrubs.
To Messrs. Dobbie, Edinburgh, for Tulips.
To Rev. H. Rollo Meyer, Watton, for Tulips.
To Messrs. W. Cutbush, Barnet for garden.
To Messrs. H. Freemantle, 19 Berkeley St., W. 1, for garden.
To Messrs. W. H. Gaze, Kingston, for formal garden.

Silver-Gilt Flora Medal.

To F. J. Hanbury, Esq., East Grinstead, for Orchids (Orchid grower, Mr. S. Farnes).
To Messrs. R. Gill, Falmouth, for Tree Ferns.
To Mr. A. Gavin Jones, Letchworth, for rock garden.
To Messrs. R. Gill, Falmouth, for Rhododendrons.
To The Orpington Nurseries Co., Orpington, for Irises.
To Messrs. H. J. Jones, Lewisham, for Hydrangeas.
To Messrs. Black & Flory, Slough, for Orchids.
To Messrs. Cowan, Southgate, for Orchids.
To Messrs. Sander, St. Albans, for Orchids.
To Messrs. J. Waterer, Sons & Crisp, Twyford, for herbaceous plants.
To Mr. E. J. Hicks, Hurst, for Roses.
To Messrs. George Jackman, Woking, for Clematis.
To Mr. R. C. Notcutt, Woodbridge, for shrubs.
To Messrs. L. R. Russell, Richmond, for trees and shrubs.
To Messrs. R. Veitch, Exeter, for trees and shrubs.
To Messrs. W. Blom, Hillegom, for Tulips.
To Messrs. J. R. Pearson, Lowdham, for Tulips.
To Messrs. Daniels, Norwich, for Tulips.
To Messrs. Oliver & Hunter, Moniaive, for Meconopsis, Primulas and other rock-garden plants.
To Messrs. M. Prichard, Christchurch, for rock-garden plants.
To Mr. G. E. Welch, Cambridge, for rock-garden plants.
To The En-Tout-Cas Co., Syston, for formal garden.
To Messrs. R. Wallace, Tunbridge Wells, for formal garden.

Silver-gilt Banksian Medal.

To Messrs. M. Koster, Boskoop, for Rhododendrons.
To Messrs. G. Bunyard, Maidstone, for Irises.
To Messrs. Alex. Dickson, Newtownards, for Sweet Peas.
To Messrs. John Peed, West Norwood, for greenhouse and stove plants.
To Mr. John Evans, Colwyn Bay, for Orchids.
To Messrs. Stuart Low, Jarvis Brook, for Orchids.
To Messrs. Mansell & Hatcher, Rawdon, for Orchids.
To Messrs. Bakers, Codsall, for Delphiniums, Lupins, Astilbes, etc.
To Messrs. Carter Page, London Wall, for Dahlias.
To Mr. G. H. Dalrymple, Bartley, for Lupins.
To Messrs. E. J. Redgrove, Borough Green, for herbaceous plants.
To Messrs. Chaplin, Waltham Cross, for Roses.
To Messrs. Burkwood & Skipwith, Kingston, for trees and shrubs.
To Messrs. J. Cheal, Crawley, for trees and shrubs.
To The Donard Nursery Co., Newcastle, Co. Down, for shrubs.
To Messrs. W Fromow, Chiswick, for Japanese Maples.
To Mr. W. J. Marchant, Wimborne, for trees and shrubs.
To Messrs. G. Reuthe Keston, for mixed group of shrubs and Rhododendrons.
To Messrs. J. Waterer, Sons & Crisp, Twyford, for trees and shrubs.
To Messrs. W. Watson, Dublin, for Brooms.
To The Yokohama Nursery Co., Kingsway, London, for Japanese Dwarf Trees, Kurume Azaleas, etc.
To The Brookside Nurseries, Oxford, for rock-garden plants and shrubs.
To Mr. A. Gavin Jones, Letchworth, for rock-garden plants.
To Mr. W. Wells, jr., Merstham, for rock-garden plants.
To Messrs. H. Prins, Wisbech, for Tulips.
To Mr. W. A. Watts, St. Asaph, for Tulips.
To Messrs. The Bronwylfa Fruit Farm, St. Asaph, for Tulips.
To Messrs. R. H. Bath, Wisbech, for Tulips.
To Messrs. M Prichard, Christchurch, for mixed group of herbaceous plants and shrubs.
To Mr. J. C. Allgrove, Langley, for mixed group of herbaceous plants, trees and shrubs.

Silver-gilt Hogg Medal.

To Messrs. T. Rivers, Sawbridgeworth, for fruit trees in pots.

Silver Flora Medal.

To Mr. P. Gardner, Addingham, for rock garden.
To Messrs. W. E. Th. Ingwersen, E. Grinstead, for rock garden.
To Messrs. C. B. van Nes, Boskoop, for Azaleas and Rhododendrons.
To Mr. G. G Whitelegg, Chislehurst, for Azaleas.
To Mr. James Douglas, Gt. Bookham, for border Carnations.
To Messrs. Stuart Low, for Carnations.
To Messrs. Blackmore & Langdon, Bath, for Gloxinias.
To Mr A. Dawkins, for Schizanthus.
To Mr. James Douglas, Gt. Bookham, for Auriculas.
To Messrs. Dobbie, Edinburgh, for Dahlias.
To Messrs. Kelway Langport, for Pæonies, Delphiniums, Pyrethrums, etc.
To Messrs. Wm. Wood, Taplow, for herbaceous plants.
To Messrs. G. Reuthe, Keston, for rock-garden plants.
To Messrs. W. H. Rogers, Southampton, for rock-garden plants and shrubs.
To Messrs. J. Cheal, Crawley, for formal garden.

Silver Banksian Medal.

To C. G. Osborne, Esq., Marlow, for Orchids (Orchid grower, Mr. J. E. Jones).
To Gus Mayer, Esq., Woldingham, for Orchids (gr. Mr. R. Cottam).
To Mr. F. Street, Chobham, for Rhododendrons and Japanese Maples.
To Mr. F. Gomer Waterer's Knaphill Nursery, Ltd., Knaphill, for Rhododendrons.
To The Southgate Nurseries, Southgate, for Azaleas.
To Messrs. D. Stewart, Wimborne, for Azaleas.
To Mr. G. G. Whitelegg, for Irises.
To Mr. J. Stevenson, for Sweet Peas.
To Messrs. L. A. Lowe, Crawley Down, for border Carnations.
To Messrs Keith Luxford, Sawbridgeworth, for Carnations.
To The Studley College, Studley, for Cinerarias.
To Messrs. H. Dixon, Wandsworth, for Orchids.

To Messrs. Sutton Bros., Hassocks, for Orchids.
To Mr. W. Yandell, Maidenhead, for Violas and Pansies.
To Messrs. Frank Cant, Colchester, for Roses.
To Messrs. Bakers, Codsall, for rock-garden plants.
To Messrs. Clarence Elliott, Stevenage, for rock-garden plants.
To Messrs. Maxwell & Beale, Broadstone, for rock-garden plants.
To Messrs. J. Waterer, Sons & Crisp, Twyford, for rock-garden plants.
To Messrs. Wm. Wood, Taplow, for rock-garden plants.
To Messrs. Bees, Chester, for mixed group of herbaceous, bulbous, rock-garden plants and shrubs.
To Messrs. E. Webb, Stourbridge, for flowering plants from seeds.
To Messrs. Barr, Covent Garden, for mixed group of Irises, herbaceous, bulbous and rock-garden plants.

Silver Lindley Medal.

To Sir Daniel Hall, K.C.B., Merton, for Tulips.

Flora Medal.

To Mr. T. M. Endean, Laindon, for Cacti and Succulents.
To Messrs. Bakers, Codsall, for herbaceous plants.
To Mr. R. Sandford, Suffolk, for Iceland Poppies.
To Messrs. Suffolk Seed Stores, Woodbridge, for Pyrethrums and other herbaceous plants.
To Mr. C. Wall, Bath, for Aquilegias.
To Mrs. D. Bucknall, Doneraile, co. Cork, for Anemones.
To Messrs. Patricks, Sevenoaks, for trees and shrubs.
To Messrs. G. Reuthe, Keston, for Conifers.
To Messrs. Bowell & Skarratt, Cheltenham, for rock-garden plants.
To Messrs. Clarence Elliott, Stevenage, for sunk gardens.
To Messrs. Ingwersen, East Grinstead, for rock-garden plants.
To Messrs. Wakeley Bros., Bankside, S.E., for Tulips.
To Mr. James MacDonald, Harpenden, for formal grass garden.
To Messrs. B. Ladhams, Ltd., Southampton, for hardy plants.
To Mr. T. Smith, Newry, Ireland, for mixed group of shrubs and hardy plants.
To Messrs. M. Prichard, Christchurch, for mixed group of herbaceous plants and shrubs.

Banksian Medal.

To Mr. H. G. Longford, Abingdon, for rock garden.
To Mr. S. Sims, Draycott, for rock garden.
To Messrs. C Engelmann, Saffron Walden, for Roses.
To Messrs. Bakers, Codsall, for shrubs.
To Messrs. Baggesen, Pembury, for shrubs.
To Messrs. Harrods, London, for clipped Box and Bay trees.
To Mr. John Klinkert, Richmond, for clipped Box trees.
To Messrs. Backhouse, York, for rock-garden plants and shrubs.
To Messrs. Clark, Dover, for rock-garden plants.
To Messrs. Kent, Brydon & Haigh, Darlington, for rock-garden plants.
To Mr. H. Hemsley, Crawley, for rock-garden plants and shrubs.
To Messrs. C. Engelmann, Saffron Walden, for Pansy garden.
To Messrs. G. Gibson, Bedale, for mixed group of shrubs, herbaceous plants and Alpines.
To Messrs. George Jackman, Woking, for mixed group of herbaceous plants, rock-garden plants and shrubs.

Silver-gilt Grenfell Medal.

To Lady Beatrix Stanley, Madras, for paintings of Indian plants.

Silver Grenfell Medal.

To Mr. E. A. Bowles, Waltham Cross, for paintings of flowers.
To Miss F. L. Bunyard, Rye, for water-colour paintings of fruit.
To Mr. W. J. Caparne, Guernsey, for paintings of gardens and flowers.
To Miss B. A. Matchwick, Reigate, for paintings of Cinerarias.
To Mr. L. D. Philpot, Sevenoaks, for paintings and drawings of gardens and flowers.
To Mrs. A. C. Reeves-Fowkes, Eastbourne, for water-colour paintings of flowers.
To Miss E. Savory, Chertsey, for paintings of flowers.
To Miss Winifred Walker, London, for paintings of flowers grown in Madeira and elsewhere.

Grenfell Medal.

To Miss L. M. Gibbard, Esher, for twenty-eight plant portraits.
To Miss M. I. Greenfield Lindfield, for paintings of orchids.
To Mrs. M. Oddie, Uckfield, for pictures of flowers.
To Mr. L. Perugini, Rye, for paintings and drawings of flowers and vegetables.

JUNE 2, 1931.

SEWELL MEDAL COMPETITIONS.

The Sewell Medal for the best exhibit of six pots or pans of plants suitable for the rock garden or alpine house.

Amateur Grower.

To Mark Fenwick, Esq., P.J., Abbotswood, Stow-on-the-Wold.

Trade Grower.

To Messrs. Clarence Elliott, Stevenage.

JUNE 16, 1931.

Sir WILLIAM LAWRENCE, Bt., V.M.H., in the Chair.

A lecture was given by Mr. H. Cowley on " Plant Collecting in Albania."

JUNE 23, 1931.

AMATEURS' FLOWER SHOW.

CHIEF AWARDS.

Silver Cup, to the most successful competitor in Division A.
To Lionel de Rothschild, Esq., O.B.E., V.M.H., Exbury House, Southampton.

Silver Cup, to the most successful competitor in Division B.
To Mr. J. F. Junkin, Ravenswold, Kenley, Surrey.

Silver Cup, to the most successful competitor in Division C.
To Mr. C. Luckin, Wadlands, East Grinstead.

A lecture was given by Mr. G. F. Wilson, F.E.S., N.D.H., on " Fruit Pollination and Insects."

JUNE 30, 1931.

Mr. W. B. CRANFIELD, F.L.S., in the Chair.

A lecture was given by Mr. A. Osborn on " Impressions of Gardening in New England " (see p. 42).

JULY 1, 1931.

Mr. E. A. BOWLES, M.A., F.L.S., F.E.S., V.M.H., in the Chair.

A lecture was given by Sir Arthur Hort, Bt., V.M H., on " Veronicás in my Garden."

JULY 14, 1931.

CLAY CHALLENGE CUP COMPETITION.

The Clay Challenge Cup, which was offered for award for a new rose possessing the true old rose scent, was not awarded.

JULY 28, 1931.

Sir ARTHUR W. HILL, K.C.M.G., F.R.S., Sc.D., M.A., F.L.S., in the Chair.

A lecture was given by Mr. H. F. Comber on " Plant Collecting in Tasmania" (see p. 32).

SCIENTIFIC COMMITTEE.

March 10, 1931, Sir DAVID PRAIN, F.R.S., V.M.H., in the Chair, and nine other members present.

Senecio vulgaris vars.—Mr. Fraser showed a series of forms of *Senecio vulgaris*, including var. *praecox*, var. *erectus* (and the rayed form which he had formerly considered a hybrid between *S. squalidus* and *S. vulgaris*) and var. *lanuginosus* from various British stations.

Cyclamen persicum.—Messrs. Sutton showed a series of seedlings of *Cyclamen persicum* illustrating the development of the plant through two or three generations under cultivation.

March 24, 1931, Sir DAVID PRAIN, F.R.S., V.M.H., in the Chair, eight other members and Mr. T. HAY, V.M.H., present.

Meconopsis sp.—Mr. Hay showed a series of Meconopsis in their first year of growth in pots, raised from seed collected in Nepal. Mr. Hay included *M. paniculata, M. regia, M. auriculata* and some unnamed species, the determination of which awaits the flowering. Sir David Prain made some remarks upon the distribution of the species and the Committee thanked Mr. Hay.

Iris unguicularis var. *lazica.*—Sir Wm. Lawrence sent specimens of *Iris unguicularis* and the var. *lazica* for comparison, pointing out the characteristics of the variety. The triangular stem which is said to be characteristic of the variety was not very evident.

Tulip with seven perianth segments.—Mr. Fraser showed a tulip with seven segments instead of the normal six.

April 14, 1931, Sir DAVID PRAIN, F.R.S., V.M.H., in the Chair, and nine other members present.

Cyclamen with petaloid stamens.—Mr. Odell showed a flower of *Cyclamen persicum* with petaloid stamens giving a partially double flower.

Wheat-ear Pelargonium.—Mr. Bowles showed an inflorescence of a variety of *Pelargonium zonale* in which the bracts were repeated again and again to produce growths similar to that seen in the " wheat-ear " carnation.

Breaking of tulips.—Sir Daniel Hall sent examples of *Tulipa ingens* with darker lines in the perianth, produced, he believed, as the result of inoculation with a virus from a broken form of the garden tulip.

Pyrus latifolia.—Mr. Fraser showed dried specimens of different plants of *Pyrus latifolia* from various localities and remarked upon their peculiarities. He believed the plant to be a hybrid of *Pyrus torminalis* and probably *P. intermedia*, not, he thought, *P. Aria*.

April 21, 1931, G. W. E. LODER, Esq., in the Chair, and ten other members present.

Osteospermum moniliferum.—Mr. Preston showed fruits of this curious South African plant with an extremely hard pericarp.

Salix monoecious.—He also showed shoots of *Salix vitellina pendula* (which is probably *S. babylonica* × *S. vitellina*) bearing both male and female catkins.

Synjackia Redheriana.—Mr. Marsden Jones showed fruits of this species from China. It does not appear to be in cultivation yet.

Effect of length of daylight upon the growth and flowering of Saxifrages.—Mr. Tincker showed a series of plants of a form of *Saxifraga caespitosa* which had been exposed to light of different daily duration for some weeks. The plant given ten hours' daylight and seven of electric light of low candle-power was in flower, that given ordinary daylight was less forward and, like the former, was rather loose in its growth ; the plant given ten hours' daylight all through was dwarfer and not yet in flower, the one given six hours only was very compact and had not commenced to throw up its flower spike.

Abnormalities in the flowering of fruits.—Mr. Hooper pointed out the lateness of the flowering of pears, plums and apples in the present year, and especially drew attention to the overlapping of the flowering of cherries with plums, which he regarded as very unusual.

Ligustrum vulgare.—Mr. Fraser showed dried specimens of the common privet from a hedge at Bloxham, near Banbury, which were said to bear yellow flowers

from their first opening. Mr. Fraser was asked to examine further into the matter and, if possible, to see fresh flowers, in view of the readiness with which the flowers of this plant discolor with age.

May 5, 1931, Mr. G. W. E. LODER in the Chair, and seven other members present.

African Shrubs.—Mr. Baker showed specimens of the foliage and floral organs and fruit of an unnamed shrub from Tanganyika territory. Although the flowers somewhat resemble those of Prunus sp., the unusual fruit placed this plant in the family Connaraceae. Probably a new genus would be defined to accommodate this species, and Mr. Baker promised to report to the Committee the name adopted.

Death of Cereus plants.—Mr. Worsley exhibited part of a plant of *Cereus validus*. A blue discoloration of the stem preceded the rapid death of a large specimen. Mr. Worsley was asked to submit the roots to a thorough examination by a mycologist.

Scented Helichrysum.—Mr. Hales showed a Japanese Helichrysum, bearing a curious scent which many believed to be artificially imparted to the dry specimen Mr. Baker kindly undertook to identify the specimen.

June 2, 1931, Professor H. E. ARMSTRONG, F.R.S., in the Chair, five other members and Mr. VAN DE WEYER (visitor), present.

Fasciated Daphne.—Mr. Van de Wever brought a fasciated Daphne from Dorsetshire, and pale gorse (*Ulex europaeus*) from Wareham Heath.

Arenaria serpyllifolia.—Mr. Odell drew attention to the vigorous growth of *Arenaria serpyllifolia* at Newmarket and said that ewes had been killed by it, through "balling."

Gladiolus with five-partite fruit.—Mr. Preston sent the fruit of a Gladiolus with 5 divisions, from the garden of Dr. Hindley at Littleport.

Armeria cinerea.—He also sent a proliferous plant of *Armeria cinerea.*

Resolved on the motion of the Chairman—There appears to be distinctly less flavour in present-day vegetables, such as Asparagus, Broad Beans, etc., compared with those of fifty years ago. The Committee desires to ask the Council to consider the advisability of taking steps to retrieve this loss.

June 16, 1931, Mr W. HALES, A.L.S., V.M.H., in the Chair, and five other members present.

Helichrysum.—Mr. E. G. Baker reported that the species shown to the Committee on May 5 was not a Japanese species but more closely resembled *Helichrysum rutilans*, a Cape species. This species is without natural scent.

Jasminum species.—Mr. Hosking exhibited flowering branches of *Jasminum Beesianum*, *J. primulinum* with double flowers, and the cross between *J. officinale affine* and *J. Beesianum* called *J.* × *stephanense.*

Flowering shrubs.—Mr. Hosking also showed branches of *Schizophragma hydrangeoides*, *Trachelospermum jasminoides* (variegated form), and *Weigela hybrida.*

Aquilegia hybrids.—A hybrid Aquilegia raised from the cross *A. pyrenaica* × *A. ecalcarata*, with dark purple flowers, was examined by the Committee.

Primula hybrid.—A large Primula with salmon flowers of origin *Primula burmanica* × *P.* × 'Aileen Aroon' was exhibited. These two hybrids were sent by Mr. P. Gardner, Craven Nurseries, York.

Ricinus Seeds and Ricin.—Dr. Voelcker showed seeds of *Ricinus* identified by the Committee as *R. communis*, *R. africanus*, and *R. Gibsonii.* Small fragments of seeds, very difficult to detect in imported cattle foods, had proved highly poisonous to live stock in different parts of the country. The peculiar toxic properties are due to an albumin, ricin, together with a globulin in the seed.

Plants before the Committee for identification included a Sedum sp. from the Atlas Mountains, Cephalotaxus sp., Eucalyptus sp., Rhododendron sp. and Mentha sp., which were reserved for examination.

June 30, 1931, Sir DAVID PRAIN, F.R.S., V.M.H., in the Chair, and six other members present.

Various plants.—Several plants sent from other Committees were examined. A Gladiolus from Mr. C. Ingram was referred to Mr. N. E. Brown, a Gentian from Sir W. Lawrence to Mr. E. G. Baker, and a Pelargonium from Lady Byng to Mr. Fraser.

Hybrid Digitalis.—Mr. Perry sent a series of hybrid Digitalis made at Enfield by him between *D. Fontainesii* and *D. orientalis*, giving tall yellow-flowered

plants with a tinge of red in the corolla, and *D. gloxiniaeflora* × *D. orientalis* with pinkish-cream flowers.

Sectorial Chimera.—Mr. Bedford sent a water-lily flower from Exbury of the variety 'Escarboucle' in which about a half of the flower was pure white, the remainder being of the normal scarlet of the variety.

Seedling Cherries.—Mr. W. B. Crane of the John Innes Horticultural Institution showed a series of seedling Cherries raised at Merton. The Committee unanimously recommended a Certificate of Appreciation for his work.

Lobelia Ryderi.—A deep purple Lobelia was shown by Messrs. Ryder of St. Albans under this name, which the Committee considered from its habit may be a form of *Lobelia Erinus* (see below).

Plants before the Committee on the last occasion were reported upon by Mr. Baker, who identified them as *Cephalotaxus Fortunei* and *Pistorrhinia branchyantha* (not Sedum). The Eucalyptus was considered to be *E. coccifera*, though its foliage bore a close resemblance to *E. Gunnii*, as seen in the type specimen of that plant at South Kensington.

Teucrium Scorodonia var. *acrotomum* and *Salix repens* var. *prostrata* were shown as dried specimens by Mr. Fraser, the latter from Ham Common, Surrey.

July 14, 1931, Sir DAVID PRAIN, F.R.S., V.M.H., in the Chair, and six other members present.

Pelargonium acetosum.—Mr. Fraser reported that he had examined the Pelargonium sent to the last meeting by Lady Byng and found it to be *P. acetosum*, figured in the *Bot. Mag.* t. 103.

Streptocarpus Holstii was sent by the Director, John Innes Horticultural Institution. It was a somewhat straggling species with rather small foliage, and bore many flowers. It is a native of German East Africa.

Double Clematis.—Mr. Tincker drew attention to a double Clematis which had appeared on a plant at Rock House, Mells, Somerset, hitherto, so far as had been seen, bearing only single white flowers.

July 28, 1931, Sir DAVID PRAIN, F.R.S., V.M.H., in the Chair, and eleven other members present.

Lobelia campanulata.—Mr. Cotton reported that the Lobelia shown at the last meeting under the name *L. Ryderi* is *L. campanulata*, a species introduced many years ago from Namaqualand. It is nearly related to *L. debilis* and is sometimes called *Monopsis campanulata*.

Dianthus barbatus.—Mr. Hanbury showed flowers of *Dianthus barbatus*, raised from seed collected by him in the Pyrenees, and bearing rather small magenta flowers.

Gentiana robusta.—Mr. Baker reported that Mr. Marquand was of opinion that the plant sent to a recent meeting under the name *Gentiana Waltoni* and named *G. robusta* was probably identical with Maximowicz's *G. straminea*, but he desired to see basal leaves.

Various plants.—Plants called respectively *Watsonia Galpinii* from Knysna Forest, *Gladiolus quaternianus* and *G. tristis* were referred to Kew for naming.

Hydrangea serrata.—A plant sent to Floral Committee B. under the name of *H. japonica* var. *acuminata* from Messrs. Bakers of Wolverhampton was examined and assigned to *H. serrata* var. *pubescens*.

Geum Mrs. Bradshaw aberrant.—Mr. Fraser showed an aberrant form of *Geum Mrs. Bradshaw* in which the double flowers had only the tips of the petals red, the remainder being green.

Forms of Antirrhinum majus.—Professor Baur of Berlin sent a long series of seedlings of *Antirrhinum majus* derived from his cultures, showing that small variations arise in pure lines, and that the rate at which such varieties arise can be greatly hastened by subjecting the plants to X-rays.

FRUIT AND VEGETABLE COMMITTEE.

March 10, 1931, Mr. E. A. BUNYARD, F.L.S., in the Chair, and eleven other members present.

Awards Recommended :—

Silver-gilt Hogg Medal.

To The South African Co-operative Deciduous Fruit Exchange, Ltd., for an exhibit of South African Fruits arranged by the Imperial Fruit Show, Ltd.

Other Exhibits.

Mr. E. A. Bunyard, Allington : Apples 'Claygate Pearmain' and 'Lord Hindlip.'

March 24, 1931, Mr. E. A. BUNYARD, F.L.S., in the Chair, and twelve other members present.

Exhibits.

Mr. W. Meeker, Fiddington, and Sir A. W. Hill, Kew : Apples.

April 8, 1931, Mr. E. A. BUNYARD, F.L.S., in the Chair, and eleven other members present.

Exhibits.

Mr. W. F. M. Copeland, Southampton : Apples 'Wolf River' and 'Delicious.'

Mr. E. A. Bunyard, Allington : Apple 'Reinette du Canada.'

April 21, 1931, Mr. E. A. BUNYARD, F.L.S., in the Chair, and seven other members present.

Exhibits.

Mr. F. Streeter, Petworth Park Gardens : 'The Newberry.'

Mr. E. A. Bunyard, Allington : Apple 'Lord Burghley.'

Mr. E. Markham, High Barnet : Apple 'Delicious.'

Mr. R. B. Rogers, Launceston : Apple 'Duchess of Cornwall.'

May 5, 1931, Mr. E. A. BUNYARD, F.L.S., in the Chair, and eight other members present.

Exhibits.

Mr. F. Streeter, Petworth : *Morchella esculenta.*

Mr. T. Avery, Hemel Hempstead : seedling Strawberry.

May 19, 1931, Mr. J. CHEAL, V.M.H., in the Chair, and twenty-three other members present.

Exhibits.

Sir Wm. Lawrence, Bt., Burford : Purple-leaved Sorrel, and *Hibiscus sabadariffa.*

June 2, 1931, Mr. E. A. BUNYARD, F.L.S., in the Chair, and nine other members present.

Exhibits.

Mr. E. A. Bunyard, Allington : Chinese Early Cherry (*Prunus pseudocerasus*).

Mr. W. Barnett, Reading : Apple 'Sturmer Pippin.'

Imperial Fruit Show, Ltd. : Australian, New Zealand, and South African Apples in season.

June 16, 1931, Mr. J. CHEAL, V.M.H., in the Chair, and seven other members present.

Award Recommended :—

Silver Hogg Medal.

To Messrs. T. Rivers, Sawbridgeworth for Cherries in pots.

June 30, 1931, Mr. C. G. A. NIX, V.M.H., in the Chair, and ten other members present.

Awards Recommended :—

Cultural Commendation.

To Mr. F. Streeter, gardener to Lord Leconfield, Petworth Park, for Grapes, Melons, and Nectarines.

Certificate of Appreciation.

To John Innes Horticultural Institute, Merton, for exhibit of 50 seedling Cherries.

The Strawberry 'Gaddesden,' exhibited by Sir Wm. Halsey, Gaddesden Place, Hemel Hempstead (gardener, Mr. T. Avery), was recommended for inclusion in the Commercial Fruit Trials at Wisley.

Other Exhibits.

Miss M. Luckey, Kew: seedling Cherry.

Messrs. Laxton, Bedford: Strawberries.

The Women's Farm and Garden Association, London, N.W. 1: collection of vegetables.

July 14, 1931, Mr. E. A. BUNYARD, F.L.S., in the Chair, and nine other members present.

The seedling Cherry No. 404, exhibited at the last meeting by the John Innes Horticultural Institution, Merton, was recommended for the Commercial Fruit Trials at Wisley.

A seedling Strawberry (unnamed), exhibited by Mr. C. J. Howlett, Earley, Reading, was recommended for trial at Wisley (for garden purposes).

Exhibits.

Major Walker, Brecon: Cherries for opinion.

Mr. E. A. Bunyard, Allington: Cherries 'Tigre,' 'Napoleon,' and 'Pelissier.'

Tiptree & District Hort. Soc.: Carrots.

Mr. H. Hemsley, Crawley: collection of Gooseberries.

July 28, 1931, Mr. E. A. BUNYARD, F.L.S., in the Chair, and ten other members present.

Exhibits.

Mr. H. Hemsley, Crawley: collection of Gooseberries.

Miss E. M. Lupton, Leeds: Cherry for opinion.

Mr. E. A. Bunyard, Allington: Cherry 'Lemercier.'

Mr. B. Havergill, Farringdon: seedling Raspberry.

The awards recommended by the sub-committee visiting Wisley to judge the trials of Maincrop Peas and Shallots were confirmed.

FLORAL COMMITTEE, Section A.

March 10, 1931, Mr. G. W. LEAK, V.M.H., in the Chair, and sixteen other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Hon. Marshall Brooks (gr. Mr. A. Carter), Tarporley, for Hippeastrums.

To Messrs. Sutton, Reading, for Primulas.

Silver Banksian Medal.

To Messrs. Cutbush, Barnet, for Roses.

To Mr. G. H. Dalrymple, Bartley, for Freesias.

To Messrs. Engelmann, Saffron Walden, for Carnations and Roses.

Banksian Medal.

To Mr. E. J. Hicks, Hurst, for Roses.

To Messrs. Low, Enfield, for Carnations.

Award of Merit.

To *Freesia* ' Rockwood ' for cutting (votes 12 for), from Mr. G. H. Dalrymple, Bartley. Height 20 inches ; 7 flowers to the spike, 3 or 4 out at a time ; flowers large, cream, throat shaded orange, reverse faintly tinged dull mauve, sweetly scented. Free flowering, flowers and foliage of good substance. Raised by the exhibitor.

Other Exhibits.

Hon. Marshall Brooks, Tarporley : *Hippeastrum* ' Portal Beauty ' and *H.* ' Portal Triumph.'

Misses Hopkins, Coulsdon : hardy plants.

Mr. G. Prince, Oxford : Roses.

March 24, 1931, Mr. G. W. LEAK, V.M.H., in the Chair, and twenty-two other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Mr. G. H. Dalrymple, Bartley, for Freesias.

To Messrs. Engelmann, Saffron Walden, for Carnations and Roses.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Cutbush, Barnet, for Roses.

To Mr. E. J. Hicks, Hurst, for Roses.

To Messrs. Sander, St. Albans, for *Clivia miniata robusta.*

Banksian Medal.

To Mr. J. J. Kettle, Corfe Mullen, for Violets.

To Mr. H. G. Longford, Abingdon, for Primroses, Freesias, etc.

To Messrs. Low, Enfield, for Carnations.

To Messrs. G. Prince, Longworth, for Roses.

To Messrs. Wheatcroft, Gedling, for Rose ' Gloria Mundi.'

To The Women's Farm and Garden Association, London, for Violets, Polyanthus, Schizanthus, etc.

Award of Merit.

To *Freesia* ' Mrs. Wilfrid Ashley ' for cutting (votes unanimous), from Mr. G. H. Dalrymple, Bartley. Height 18 inches ; 7 flowers to the spike, 4 or 5 out at a time ; very free flowering ; flowers deep rosy-carmine, throat cream lined carmine, centre of lower petals yellow, flowers darken with age. Raised by the exhibitor, who considers it the deepest coloured Freesia of this section.

Selected for trial at Wisley.

Begonia ' Sunset ' from Mr. A. Humphrey, Henfield.

Begonia ' Peach Blossom ' from Mr. A. Humphrey, Henfield.

Other Exhibits.

Messrs. Allwood, Haywards Heath : Carnation ' Admiration ' which the Committee desired to see again.

Misses Hopkins, Coulsdon : hardy flowers.

Mr. G. W. Miller, Wisbech : Polyanthus, Primroses, etc.

April 8, 1931, Mr. G. W. LEAK, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended :—

Gold Medal.

To Mr. G. H. Dalrymple, Bartley, for Freesias.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.
To Messrs. Cutbush, Barnet, for Roses.
To Messrs. Engelmann, Saffron Walden, for Carnations and Pansies.
To Messrs. Low, Enfield, for Carnations.
To Messrs. Prince, Longworth, for Roses.

Banksian Medal.

To Messrs. Blackmore & Langdon, Bath, for Polyanthus.
To Messrs. F. Cant, Colchester, for Roses.
To Messrs. Chaplin, Waltham Cross, for Roses.
To Mr. H. G. Longford, Abingdon, for Polyanthus.
To Mr. C. Wall, Bath, for Aquilegias and Pansies.

Award of Merit.

To *Freesia* ' Elder's Giant White ' for cutting and market (votes unanimous), from Mr. G. H. Dalrymple, Bartley. An American variety which appears to be superior to most white varieties in its freedom of flowering, substance of petal, lasting qualities, pureness of its white colour and its constitution. Height 20 inches ; 6 flowers to the spike, 3 out at a time ; flowers 1¾ inch diameter, primrose at base of throat ; sweetly scented.

Other Exhibits.

Mr. A. Hansen, New Barnet : Primula ' Kathleen.'
Misses Hopkins, Coulsdon : hardy plants.
Mr. J. J. Kettle, Corfe Mullen : Violets.
Messrs. Low, Enfield : Carnation ' Lady Brodie Henderson.'
Mr. G. W. Miller, Wisbech : Polyanthus, etc.

April 21, 1931, Mr. G. W. LEAK, V.M.H., in the Chair, and twenty-three other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Chaplin, Waltham Cross, for Roses.
To Mr. G. H. Dalrymple, Bartley, for Freesias and Primulas.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.
To Messrs. Blackmore & Langdon, Bath, for Polyanthus.
To Messrs. Engelmann, Saffron Walden, for Carnations, Roses and Pansies.

Banksian Medal.

To Messrs. F. Cant, Colchester, for Roses.
To Miss C. Christy, Chelmsford, for Polyanthus, Primroses, etc.
To Messrs. Ladhams, Southampton, for hardy plants.
To Messrs. Low, Enfield, for Carnations.
To Mr. G. W. Miller, Wisbech, for Primroses and Polyanthus.
To Mr. C. Wall, Bath, for Aquilegias.

Selected for trial at Wisley.

Aubrietia ' George Downer ' from Mr. G. R. Downer, Chichester.

Other Exhibits.

Messrs. John and A. H. Crook, Beaconsfield : Polyanthus.
Farnham Royal Nurseries, Farnham Royal : Carnations ' Fair Lady ' and ' Judy.'
Misses Hopkins, Coulsdon : Primulas, Polyanthus, etc.
Mrs. Wigan (gr. Mr. W. Pilgrim), Danbury : Schizanthus.

May 5, 1931, Mr. G. W. LEAK, V.M.H., in the Chair, and twenty other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Dobbie, Edinburgh, for Calceolarias and Schizanthus.
To Messrs. Sander, St. Albans, for Anthuriums.
To Messrs. Sutton, Reading, for Cinerarias.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.
To Army Vocational Training Centre, Chiseldon, for Calceolarias and Hippeastrums.
To Mr. E. Ballard, Colwall, for Auriculas and Polyanthus.

To Messrs. Blackmore & Langdon, Bath, for Schizanthus.
To Mrs. Bucknall, Doneraile, for Anemones.
To Messrs. B. R. Cant, Colchester, for Roses.
To Messrs. Engelmann, Saffron Walden, for Carnations.
To Mr. E. J. Hicks, Hurst, for Roses.
To Messrs. Jones, Lewisham, for Hydrangeas.
To Messrs. Peed, West Norwood, for Streptocarpus.

Banksian Medal.

To Messrs. Allen, Norwich, for Roses.
To Messrs. F. Cant, Colchester, for Roses.
To Mrs. Fremantle, Penn, for Polyanthus.
To Messrs. Low, Enfield, for Carnations.
To Mr. G. W. Miller, Wisbech, for Polyanthus and Primroses.
To Messrs. Prince, Longworth, for Roses.

Award of Merit.

To *Anthurium Scherzerianum* 'Cardinal' as a stove plant (votes unanimous), from Messrs. Sander, St. Albans. A very handsome variety with a large oval crimson-scarlet spathe and a curled orange spadix.

Other Exhibits.

Messrs. Allen, Norwich: Rose 'Allen's Jubilee.'
Mr. G. Carpenter, Byfleet: Hippeastrum 'Goliath.'
Messrs. Clark, Dover: Anemones, Polyanthus, etc.
Messrs. J. & A. H. Crook, Beaconsfield: Polyanthus.
Mr. G. R. Downer, Chichester: Aubrietia 'Crimson Queen.'
Farnham Royal Nurseries, Farnham Royal: Carnation 'Judy.'
Mesrss. Jarman, Chard: Pelargoniums.
Messrs. Low, Enfield: Carnation 'Lady Brodie Henderson.'
Messrs. Stark, Fakenham: Polyanthus, etc.

May 19, 1931 (at Chelsea), Mr. G. W. LEAK, V.M.H., in the Chair, and nineteen other members present.

Awards Recommended:—

Award of Merit.

To *Hippeastrum* 'Rosemary' as a greenhouse pot plant (votes 12 for, 2 against), from Lionel de Rothschild, Esq. (gr. Mr. A. Bedford), Exbury. A large, rich, crimson-scarlet variety with white blotches on the segments. It is the result of a cross between the varieties 'Roseleaf' and 'Rose Velvet.'

To *Hydrangea* 'Mrs. W. J. Hepburn' as a greenhouse plant (votes unanimous), from Messrs. H. J. Jones, Lewisham. A magnificent soft pink variety with large heads of flower.

To Rose 'Lady Violet Astor' for cutting (votes 12 for, 4 against), from Messrs. B. R. Cant, Colchester. A soft pink Hybrid Tea variety having full flowers of good form with rolled petals. The colour deepens towards the centre.

To Rose 'Trigo' for cutting (votes 17 for), from Messrs. Dickson, Newtownards. A creamy-yellow Hybrid Tea variety deeply flushed with apricot. It is of excellent form, sweetly scented, and has the appearance of being a strong grower.

Selected for trial at Wisley.

Double Nasturtium 'Golden Gleam,' from Messrs. Dobbie, Edinburgh.
Stock 'The Harbinger' from Messrs. Watkins & Simpson, London.

Other Exhibits.

Messrs. Allwood, Haywards Heath: *Dianthus Allwoodii alpinus* 'Pan' and 'Tinkerbell.'
Messrs. Blackmore & Langdon, Bath: Begonia 'Sir Philip Sassoon' (**A.M.** 1927).
Messrs. F. Cant, Colchester: Roses.
Mr. W. Gaudell, Maidenhead: Pansy 'Golden Rain.'
W. Mann, Esq., Dunstable: Myosotis 'Lady Florence.'
Mr. H. Marcham, Carshalton: Trifolium 'Emblem of Luck,' Mimulus 'Chelsea Pensioner,' Pansy 'Chelsea.'
Mr. J. H. Miland, Terrington St. Clement: Begonia 'Irene.'
Messrs. Sliedrecht, Boskoop: Roses.
Suffolk Seed Stores, Woodbridge: Pyrethrum 'Kingston Early.'

June 2, 1931, Mr. G. W. LEAK, V.M.H., in the Chair, and fifteen other members present.

Awards Recommended:—

Gold Medal.

To Messrs. Bees, Chester, for herbaceous plants.

Silver-gilt Banksian Medal.
To Messrs. Artindale, Sheffield, for Eremuri.
To Messrs. Prichard, Christchurch, for herbaceous plants.
Silver Banksian Medal.
To Messrs. Allwood, Haywards Heath, for Carnations.
To Messrs. Baker, Codsall, for Delphiniums.
To Messrs. Barr, Taplow, for herbaceous plants.
To Messrs. Blackmore & Langdon, Bath, for Delphiniums.
To Messrs. Bunyard, Maidstone, for Irises.
To Mr. G. R. Downer, Chichester, for Lupins.
To Messrs. Engelmann, Saffron Walden, for Carnations, Roses, and Pansies.
To Messrs. Hewitt, Solihull, for Delphiniums and Lupins.
To Messrs. Sutton, Reading, for Lupins.
To Messrs. Waterer, Sons & Crisp, Twyford, for Irises.
Banksian Medal.
To Messrs. Bolton, Birdbrook, for Sweet Peas.
To Mr. T. Carlile, Twyford, for herbaceous plants.
To Messrs. Daniels, Norwich, for Aquilegias.
To Mr. Gavin Jones, Letchworth, for herbaceous plants.
To Messrs. Kelway, Langport, for herbaceous plants.
To Mr. G. W. Miller, Wisbech, for Trollius, etc.
To Messrs. Carter Page, London, for Dahlias.
To Messrs. Pearson, Lowdham, for Aquilegias.
To Messrs. Prince, Longworth, for Roses.
To Suffolk Seed Stores, Woodbridge, for herbaceous plants.
To Messrs. Unwin, Histon, for Poppies.
To Messrs. Wood, Ashtead, for herbaceous plants.
Selected for trial at Wisley.
Calceolaria 'Monarch,' *C.* 'Mostyn' and *C. purpurea hybrida* from Dr. E. J. Collins, Merton Park.
Lupin 'Chichester Cross' and L. 'Halnaker' from Mr. G. R. Downer, Chichester.
Pyrethrum 'Kelway's Glorious' from Messrs. Kelway, Langport.
Viola cornuta 'Hansen's Purple,' from Mr. A. Hansen, New Barnet.
The awards recommended to Alpine Auriculas and Primroses on trial at Wisley were confirmed.
Other Exhibits.
Mrs. W. Burns, Hatfield: Hippeastrum 'Cynthia.'
W. Chapman, Esq., Wisbech: *Viola cornuta purpurea* 'Clarkson.'
Messrs. Cheal, Crawley: Dahlias.
Messrs. Langridge, Westerham: Dahlias.
Messrs. Low, Enfield: Carnations.
Messrs. Redgrove, Borough Green: herbaceous plants.
A. Whitchurch, Esq., Leavesden: Viola 'Mrs. A. Whitchurch.'

June 16, 1931, Mr. G. W. LEAK, V.M.H., in the Chair, and fourteen other members present.
Awards Recommended:—
Gold Medal.
To Messrs. Dobbie, Edinburgh, for Sweet Peas.
Silver Banksian Medal.
To Mr. J. C. Allgrove, Slough, for herbaceous plants.
To Messrs. Allwood, Haywards Heath, for Carnations.
To Messrs. Baker, Codsall, for Lupins.
To Messrs. Barr, Taplow, for herbaceous plants.
To Messrs. Blackmore & Langdon, Bath, for Delphiniums.
To Messrs. Bolton, Birdbrook, for Sweet Peas.
To Messrs. Bunyard, Maidstone, for Irises, etc.
To Mr. T. Carlile, Twyford, for herbaceous plants.
To Messrs. Dickson, Newtownards, for Roses and Anemones.
To Gayborder Nurseries, Melbourne, for herbaceous plants.
To Messrs. Kelway, Langport, for Pæonies.
To Messrs. Ladhams, Southampton, for herbaceous plants and shrubs.
To Messrs. Low, Enfield, for Carnations and other greenhouse plants.
To Messrs. Prichard, Christchurch, for Lupins.
To Messrs. Russell, Richmond, for Caladiums.
To Messrs. Wakeley, London, for Irises.
To Messrs. Wallace, Tunbridge Wells, for Irises, etc.
To Messrs. Waterer, Sons & Crisp, Twyford, for herbaceous plants.

Banksian Medal.

To Messrs. Bath, Wisbech, for Pæonies.
To Brookside Nurseries, Oxford, for herbaceous plants.
To Messrs. Cheal, Crawley, for Dahlias.
To D. B. Crane, Esq., Highgate, for Violettas.
To Mr. G. R. Downer, Chichester, for Lupins.
To Messrs. Engelmann, Saffron Walden, for Carnations.
To Messrs. Gibson & Amos, Cranleigh, for herbaceous plants.
To Mr. S. J. Goodliffe, Bishop's Stortford, for herbaceous plants.
To Mr. Gavin Jones, Letchworth, for herbaceous plants.
To Messrs. Langridge, Westerham, for Dahlias.
To Mr. A. Miles, Bickley, for herbaceous plants.
To Messrs. Prins, Wisbech, for Pæonies, etc.
To Messrs. Redgrove, Borough Green, for herbaceous plants.
To Suffolk Seed Stores, Woodbridge, for herbaceous plants.
To Mr. W. Yandell, Maidenhead, for Violas.

Award of Merit.

To *Campanula rotundifolia* var. *olympica* as a hardy rock garden plant (votes unanimous), from Messrs. Watkins & Simpson, London. A very pleasing, free-flowering Campanula from Oregon. It is from 6 to 9 inches in height and has broadly campanulate porcelain-blue flowers distinctly lobed at the mouth.

The following awards were made after trial at Wisley.

Award of Merit.

To Perennial Lupin 'Northern Lilac,' from Messrs. W. H. Simpson & Sons, 209, Monument Road, Birmingham, and Messrs. Dickson & Robinson, Cathedral Street, Manchester. Described JOURNAL R.H.S., vol. **56**, p. 119. [**H.C.** 1930.] Raised by Messrs. Dickson & Robinson.

To Perennial Lupin 'Munstead Blue,' from Messrs. W. H. Simpson & Sons. Described JOURNAL R.H.S., vol. **56**, p. 119. [**H.C.** 1930.] Raised by Miss Willmott.

To Perennial Lupin 'Miss A. E. Groll,' from Messrs. W. van Veen, Leiden, Holland. Described JOURNAL R.H.S., vol. **56**, p. 118. Raised by sender.

To Perennial Lupin 'Hebe,' from Messrs. W. H. Simpson & Sons. Described JOURNAL R.H.S., vol. **56**, p. 117. [**H.C.** 1930.] Raised by sender.

To Perennial Lupin 'Grace Farwell,' from Messrs. M. Prichard, Christchurch, Hants. Described JOURNAL R.H.S., vol. **56**, p. 116. [**H.C.** 1930.] Raised by sender.

Highly Commended.

To Perennial Lupin, 'Rose Quartz,' from Mr. L. H Cox, Chez Nous Nurseries, Newick, Sussex. Described JOURNAL R.H.S., vol. **56**, p. 118. Raised by sender.

To Perennial Lupin 'Flambeau,' from Messrs. W. H. Simpson & Sons. Described JOURNAL R.H.S., vol. **56**, p. 116. Raised by sender.

To Perennial Lupin 'Splendour,' from Messrs. W. H. Simpson & Sons. Described JOURNAL R.H.S., vol. **56**, p. 117. Raised by sender.

To Perennial Lupin 'Phyllis Baker,' from Messrs. W. H. Simpson & Sons. 32 inches; flower spikes 15 to 18 inches; flowers bright rosy-red suffused orange, middle of standards lemon; free flowering. Flowering from June 5. Raised by Mr. T. Baker and introduced by Messrs. W. H. Simpson & Sons.

Selected for trial at Wisley.

Anchusa 'Morning Glory,' from Mr. H. Marcham, Carshalton.

Chrysanthemum leucanthemum 'Perry's var.,' from Mr. A. Perry, Enfield.

Lupin from New Zealand, from Mr. H. Marcham, Carshalton.

Lupinus polyphyllus 'Mrs. Benedict Hoskins,' from Mr. G. R. Downer, Chichester.

Pæony 'Lady Houston,' from Messrs. Kelway, Langport.

Pæony 'Marguerite Dessert,' from Messrs. Kelway, Langport.

Pæony 'Princess Elizabeth,' from Messrs. Kelway, Langport.

Violetta 'Enid,' from D. B. Crane, Esq., Highgate.

Violetta 'White Wings,' from D. B. Crane, Esq., Highgate.

Other Exhibits.

Messrs. Clark, Dover: herbaceous plants.

Messrs. Dickson, Newtownards: Rose 'Sir Henry Segrave.'

Messrs. Gibson & Amos, Cranleigh: Dianthus 'Winifred' and D. 'Phyllis.'

Messrs. Hayward, Clacton-on-Sea: Dianthus.

Misses Hopkins, Coulsdon: herbaceous plants.

C. A. Jardine, Esq., Chiswick: Rose 'Julia Countess of Dartrey.'

Mr. H. G. Longford, Abingdon: herbaceous plants.

Messrs. Letts, Hadleigh: herbaceous plants and Roses.

Marsden Nurseries, Ashtead: herbaceous plants.

Mr. G. W. Miller, Wisbech: Pæonies and Heucheras.
Mr. L. Moreton, Audenshaw: Lupin.
Major L. Renton, Rugby: Lupin 'Miss A. K. Renton.'

June 23, 1931 (AMATEURS' FLOWER SHOW), Mr. G. W. LEAK, V.M.H., in the Chair, and nine other members present.

No awards were recommended on this occasion.

Exhibits.

A. Ball, Esq., Bristol: Roses.
W. L. Billington, Esq., Wellingborough: Pelargonium.
Sir Wm. Lawrence, Bt., Dorking: *Kniphofia Memoria-Elwesii.*
Mrs. Talbot, Hertford: Poppy 'Esther.'

June 30, 1931, Mr. G. W. LEAK, V.M.H., in the Chair, and seventeen other members present.

Awards Recommended:—

Gold Medal.

To Messrs. Blackmore & Langdon, Bath, for Delphiniums.
To Messrs. Sutton, Reading, for Sweet Peas.

Silver-gilt Banksian Medal.

To Messrs. Barr, Taplow, for English Irises, etc.
To Messrs. Prichard, Christchurch, for herbaceous plants.
To Messrs. Waterer, Sons & Crisp, Twyford, for Delphiniums.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations and *Dianthus Allwoodii.*
To Mr. T. Bones, Cheshunt, for Delphiniums.
To Mr. S. J. Goodliffe, Bishop's Stortford, for Delphiniums, etc.
To Messrs. Kelway, Langport, for Pæonies.
To Messrs. Low, Enfield, for Carnations.
To Messrs. van Leeuwen, Sassenheim, for Pæonies.
To Messrs. Wheatcroft, Gedling, for Roses.

Banksian Medal.

To Messrs. Bath, Wisbech, for herbaceous plants.
To Messrs. F. Cant, Colchester, for Roses.
To Messrs. Clark, Dover, for herbaceous plants.
To Messrs. Engelmann, Saffron Walden, for Carnations.
To Messrs. Gibson & Amos, Cranleigh, for Dianthus, Pæonies, Roses.
To Messrs. Hayward, Clacton, for Dianthus.
To Messrs. Hewitt Solihull, for Delphiniums and Pæonies.
To Mr. Gavin Jones, Letchworth, for herbaceous plants.
To Messrs. Ladhams, Southampton, for herbaceous plants.
To Mr. A. Miles, Bickley, for herbaceous plants.
To Messrs. Sander, St. Albans, for Anthuriums.
To Suffolk Seed Stores, Woodbridge, for herbaceous plants.

First-class Certificate.

To *Nymphaea* 'Escarboucle' as an aquatic plant (votes 13 for), from L. de Rothschild, Esq. (gr. Mr. Bedford), Exbury. This very beautiful Water Lily has large, intense vermilion flowers measuring about 6 inches across. It received an Award of Merit on July 29, 1913.

Award of Merit.

To *Delphinium* 'D. B. Crane' for exhibition (votes unanimous), from Messrs. Blackmore & Langdon, Bath. A semi-double variety. Outer petals bright blue; inner petals deep lavender; eye small, white. The flowers are large and are borne in fine massive spikes.

To *Delphinium* 'Graham Seton' for exhibition (votes unanimous), from Messrs. Blackmore & Langdon. A semi-double variety. Outer petals ultramarine blue; inner petals rosy-violet; eye small, white. Spikes large and not overcrowded with flowers.

To *Delphinium* 'Lady Eleanor' for exhibition (votes unanimous), from Messrs. Blackmore & Langdon. Flowers double; outer petals sky-blue; inner petals tinged pale mauve, waved. The spikes are long and of good shape.

To *Delphinium* 'Lady Guinevere' for exhibition (votes 10 for), from Messrs. Blackmore & Langdon. Flowers semi-double; a few outer petals light blue; inner petals pale mauve; eye white. The spikes are good and the flowers well

To *Delphinium* 'Lady Teresa' for exhibition (votes unanimous), from Messrs. Blackmore & Langdon. Flowers very large, semi-double; deep rosy-purple, outer petals marked with blue; eye white. Spikes long.

Selected for trial at Wisley.

Calendula officinalis 'Radio Golden Beam,' from Messrs. Hurst, London.

Campanula persicifolia 'Kelway's White Wonder,' from Messrs. Kelway, Langport.

Delphinium 'Lady Emsley Carr,' from Messrs. Blackmore & Langdon, Bath.

Delphinium 'Lady Holt,' from Messrs. Blackmore & Langdon, Bath.

Delphinium 'Lady Rose' from Messrs. Blackmore & Langdon, Bath.

English Iris 'Almona,' from Messrs. Barr, Taplow.

Other Exhibits.

Messrs. Bunyard, Maidstone: Roses.

Misses Hopkins, Coulsdon: herbaceous plants.

Mr. G. W. Miller, Wisbech: herbaceous plants.

Messrs. Redgrove, Borough Green: *Campanula persicifolia* 'Belle of Kent.'

Mrs. Lindsay Smith, Handcross: Dianthus seedlings.

Mrs. Noel Wills, Stroud: Carnation 'Theodora.'

July 14, 1931, Mr. G. W. LEAK, V.M.H., in the Chair, and fifteen other members present.

Awards Recommended:—

Silver-gilt Banksian Medal.

To Messrs. Chaplin, Waltham Cross, for Roses.

To Messrs. Waterer, Sons & Crisp, Twyford, for herbaceous plants.

Silver Banksian Medal.

To Messrs. Bentall, Havering, for Roses.

To Messrs. B. R. Cant, Colchester, for Roses.

To Messrs. F. Cant, Colchester, for Roses.

To Mr. A. Perry, Enfield, for *Iris Kaempferi* and Nymphaeas.

To Messrs Prichard, Christchurch, for herbaceous plants.

Banksian Medal.

To Brookside Nurseries, Headington, for herbaceous plants.

To Messrs. Clark, Dover, for herbaceous plants.

To Mr. E. B. Le Grice, North Walsham, for Roses.

To Mr. W. Yandell, Maidenhead, for Violas.

Award of Merit.

To *Anthemis tinctoria*, Merstham variety for cutting (votes 8 for, 2 against), from Mr. W. Wells, Jun., Merstham. A seedling from a selected form of *A. tinctoria Kelwayi* with large bright-yellow flowers intermediate in colour between that variety and *A. tinctoria*, Buxton's variety. The plants are bushy in habit and 2½ feet in height.

To Calceolaria 'Edina' for bedding and growing in pots (votes unanimous), from T. Hay, Esq., V.M.H., London. A very free-flowering, half-hardy Calceolaria which has been grown at Edinburgh Botanic Garden for many years. The large orange flowers are spotted with crimson. The plants are normally about 2 feet high, but become tall and shrubby with age, and will then stand considerable frost.

To *Chrysanthemum maximum* 'Esther Read' for cutting and market (votes unanimous), from N. P. Read, Esq., Brundall. The flowers of this variety resemble a double white Pyrethrum, and are said to last well when cut.

To *Helenium* 'Moerheim Beauty' for cutting and growing in herbaceous borders (votes unanimous), from Messrs. Prichard, Christchurch. A variety of Dutch origin raised by Messrs. B. Ruys. The rich, dark red flowers measure 3 inches across, and the growth of the plant is very erect.

Selected for trial at Wisley.

Delphinium 'Clarendon Seedling' from Mrs. S. R. Christie-Miller, Salisbury.

Other Exhibits.

Messrs. Allwood, Haywards Heath: Dianthus 'Sweet Wivelsfield.'

Mr. T. Bones, Cheshunt: Delphinium 'Mrs. Hargreaves.'

Messrs. Bunyard, Maidstone: Roses.

Mr. A. Evans, Cranford: *Chrysanthemum maximum* 'Crusader' and *C. Leucanthemum* 'Cranford.'

Mrs. L. Fleischmann, Buckingham: Delphinium.

Mr. H. Hemsley, Crawley: Sidalceas.

Misses Hopkins, Coulsdon: herbaceous plants.

Mrs. E. Lowe, Stamford: Alstrœmeria.

The Rt. Hon. the Earl of Radnor, Salisbury: Delphinium 'Belinda.'

Lionel de Rothschild, Esq., Exbury: Nymphaea 'Sunrise.'

July 28, 1931, Mr. G. W. LEAK, V.M.H., in the Chair, and sixteen other members present.

Awards Recommended:—

Gold Medal.

To Messrs. H. J. Jones, Lewisham, for Phloxes.

Silver-gilt Banksian Medal.
To Messrs. Dobbie, Edinburgh, for annuals.
To Messrs. Lowe, Crawley Down, for Border Carnations.
Silver Banksian Medal.
To Messrs. Allwood, Haywards Heath, for Carnations.
To Messrs. Baker, Codsall, for Astilbes.
To Messrs. Blackmore & Langdon, Bath, for Phloxes.
To Messrs. B. R. Cant, Colchester, for Roses.
To Messrs. Chaplin, Waltham Cross, for Roses.
To Messrs. Dobbie, Edinburgh, for Pansies.
To Messrs. Kelway, Langport, for Gladioli.
To Messrs. Ladhams, Southampton, for herbaceous plants.
To Mr. A. Miles, Bickley, for herbaceous plants.
To Messrs. Prichard, Christchurch, for herbaceous plants.
To Messrs. Russell, Richmond, for Nymphaeas, etc.
To Messrs. Wood, Taplow, for herbaceous plants.
To Mr. W. Yandell, Maidenhead, for Violas.
Banksian Medal.
To Messrs. Bentall, Havering, for Roses.
To Messrs. Engelmann, Saffron Walden, for Carnations.
To Mr. S. J. Goodliffe, Bishop's Stortford, for herbaceous plants.
To Mr. H. Hemsley, Crawley, for Sidalceas.
To Messrs. Rich & Cooling, Bath, for Phloxes.
To Messrs. Stark, Fakenham, for herbaceous plants.
To Messrs. Wheatcroft, Gedling, for Roses.
To Mr. F. G. Wood, Ashtead, for herbaceous plants.
Award of Merit.

To *Campanula carpatica* ' Harmony ' as a hardy border plant (votes unanimous), from Messrs. Prichard, Christchurch. A free-flowering, dwarf, bushy variety with large, widely open, rounded, mid-blue flowers slightly paler in the centre.

To *Campanula carpatica* ' Riverslea Giant ' as a hardy border plant (votes unanimous), from Messrs. Prichard, Christchurch. A darker blue variety with more pointed segments to the flowers.

To Carnation ' Inez ' for cutting (votes unanimous), from Messrs. Gibson & Amos, Cranleigh. A fully double white border variety of perfect form and large size. The flowers are borne on long, stout stems.

To Chrysanthemum ' Rose Précoce ' for cutting and market (votes unanimous), from Mr. T. Stevenson, Hillingdon. An early-flowering decorative variety with bright rose-pink flowers. The colour is deeper on the unopened florets at the centre.

The following award was made after trial at Wisley :

Award of Merit.

To *Downingia pulchella* from Messrs. Sutton & Sons, Reading. Habit prostrate and spreading, 6 inches tall ; foliage sparse, dark green ; flowers ¾ inch diameter, borne singly on 1½ inch stems, flat, 5-lobed ; bright azure blue with large creamy-white centre, on the three lower lobes three small dark violet spots at eye. Very free flowering. Introduced from California by D. Douglas for the Royal Horticultural Society.

Other Exhibits.

J. A. Baxter, Esq., Sidcup Hill : Chrysanthemums.
Messrs. Brown, Peterborough : Gaillardia ' The Prince.'
Messrs. Clark, Dover : herbaceous plants.
Messrs. Hayward, Clacton : herbaceous plants.
Misses Hopkins, Coulsdon : herbaceous plants.
Messrs. Kelway, Langport : *Bocconia cordata* ' Coral Plume.'
Messrs. Peatling, Cranleigh : Carnation ' Cranleigh Beauty.'
A. H. Williams, Esq., Eastleigh : Chrysanthemum ' Sylvia May.'
Messrs. Woolman, Leicester : Carnations.

Section B.

March 10, 1931, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and twenty other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.
To Messrs. Elliott, Stevenage, for alpine plants.

Silver Banksian Medal.
To Brookside Nurseries, Oxford, for alpine plants.
To Messrs. Russell, Richmond, for shrubs.
To Mr. G. E. Welch, Cambridge, for alpine plants.
Banksian Medal.
To Messrs. Barr, Taplow, for bulbous plants.
To Messrs. Gill, Falmouth, for Rhododendrons.
To Messrs. Hillier, Winchester, for shrubs.
To Messrs. Low, Enfield, for shrubs.
To Messrs. Prichard, Christchurch, for alpine plants and shrubs.
To Mr. G. Reuthe, Keston, for shrubs.
To Messrs. Stewart, Ferndown, for shrubs and alpine plants.
To Messrs Waterer, Twyford, for shrubs and alpine plants.
To the Hon. Mrs. Colborne Vivian, St. Martin, for Rhododendrons.
Preliminary Commendation.
To *Primula Winteri alba*, from Messrs. Elliott, Stevenage.

Other Exhibits.
Messrs. Baker, Codsall : shrubs and alpine plants.
Messrs Cheal, Crawley : shrubs and alpine plants.
Chez Nous Nurseries, Newick : Kabschia Saxifrages.
Mr. H. Hemsley, Crawley : shrubs.
Hocker Edge Gardens, Cranbrook : miniature rock gardens.
The Director, John Innes Hort. Inst., Merton : *Veltheimia viridifolia.*
Lye Green Nurseries, Chesham : shrubs and alpine plants.
Marsden Nurseries, Ashtead : shrubs and alpine plants.
Messrs. Maxwell & Beale, Broadstone : shrubs and alpine plants.
E. J. P. Magor, Esq., St. Tudy : hybrid Rhododendrons.
Rev. H. R. Meyer, Hertford : bulbous Irises.
Mr. P. S. Patrick, Sevenoaks : shrubs.
Messrs. Rogers, Southampton : alpine plants.
Messrs. Sutton, Reading : Cyclamen sp. from Palestine.
Messrs. Wallace, Tunbridge Wells : shrubs and alpine plants.

March 24, 1931, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and twenty-three other members present.

Awards Recommended :—
Silver-gilt Banksian Medal.
To Messrs. Elliott, Stevenage, for alpine plants.
Silver Banksian Medal.
To Messrs. Hillier, Winchester, for flowering shrubs.
To Messrs. Low, Enfield, for greenhouse shrubs.
To Messrs. Prichard, Christchurch, for alpine plants.
To Messrs Wallace, Tunbridge Wells, for flowering shrubs.
Banksian Medal.
To Brookside Nurseries, Oxford, for alpine plants.
To Cambria Nurseries, Cambridge, for alpine plants.
To Messrs. Cheal, Crawley, for flowering shrubs.
To Mr. G. Reuthe, Keston, for flowering shrubs.
To Messrs. Russell, Richmond, for flowering shrubs.
To A. J Sewell, Esq., Weybridge, for alpine plants.
To Messrs. Waterer, Twyford, for alpine plants.
To Messrs. Waterer, Twyford, for flowering shrubs.
To Messrs. Wood, Taplow, for alpine plants and shrubs.
Award of Merit.

To *Anemone capensis* as a tender flowering plant (votes 16 for, 1 against), from T. Hay, Esq., Hyde Park. A handsome species, half shrubby at the base, producing large, bi-pinnate, sharply-toothed leaves. The flowers are solitary, 3 inches in diameter, on stalks 18 inches high. Petals numerous, lanceolate, white within, flushed with purple externally.

To *Epigaea asiatica* as a hardy flowering shrub (votes 11 for, 3 against), from Lady Aberconway and the Hon. H. D. McLaren, Bodnant. A Japanese species, differing from the better-known North American *E. repens* in its somewhat larger, bronzy leaves and flowers (in the specimen exhibited) of a deeper shade of pink. A very rare plant in cultivation.

To *Epigaea repens* as a hardy flowering shrub (votes 12 for, 5 against), from Lady Aberconway and the Hon. H. D. McLaren, Bodnant. A creeping sub-shrub with wiry stems and ovate, leathery, evergreen leaves, sparingly hairy on both sides. The sweetly fragrant, pink or white flowers are carried in small clusters. A rather difficult plant requiring shade and a peaty soil.

To *Prunus* (*Amygdalus*) *communis* var. *macrocarpa* as a hardy flowering tree (votes unanimous), from Lady Aberconway and the Hon. H. D. McLaren, Bodnant. A variety of the common Almond, forming a small tree of rather stiff habit and bearing large, single white flowers flushed externally with rose.

Other Exhibits.

G. P. Baker, Esq., Sevenoaks: *Tulipa Kaufmanniana aurea.*
Messrs. Baker, Codsall: shrubs and alpine plants.
Messrs. Barr & Sons, Taplow: alpine plants.
Messrs. C. H. Bloom & Son, Oakington: hardy plants.
Messrs. Burkwood & Skipwith, Kingston: *Osmarea* × *Burkwoodii.*
Messrs. Clark, Dover: hardy plants.
Mr. P. Gardner, Addingham: shrubs.
Dr. P. L. Giuseppi, Felixstowe: *Senecio Rodriguesii, Cossonia africana, Crocus veluchensis, Bongardia Rauwolfii.*
Messrs. Hemsley, Crawley: shrubs and alpine plants.
Mr. R. Kaye, Silverdale: alpine plants.
Mr. G. W. E. Loder, Ardingly: *Olearia ramulosa, Sycopsis sinensis, Pieris japonica, Salix gracilistyla.*
Mr. H. Marcham, Carshalton: *Trifolium tetraphyllum.*
Marsden Nurseries, Ashtead: shrubs and alpine plants.
Messrs. Maxwell & Beale, Broadstone: alpine plants.
Mr. P. S. Patrick, Sevenoaks: shrubs.
Messrs. Redgrove, Borough Green: alpine plants.
Messrs. Robinson, New Eltham: alpine plants.
Messrs. Rogers, Southampton: alpine plants.
Messrs. Stewart, Ferndown: shrubs and bulbous plants.

April 8, 1931, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and fifteen other members present.

Awards Recommended:—

Silver Banksian Medal.

To Messrs. Hillier, Winchester, for shrubs.
To Messrs. Stuart Low, Enfield, for shrubs.
To Mr. G. Reuthe, Keston, for shrubs.

Banksian Medal.

To Messrs. Barr, Taplow, for Primulas.
To Messrs. Cutbush, Barnet, for shrubs and bulbous plants.
To Messrs. Elliott, Stevenage, for alpine plants.
To Messrs. Rogers, Southampton, for rock plants.
To Messrs. Russell, Richmond, for stove plants.
To Messrs. Waterer, Bagshot, for shrubs and rock plants.
To Mr. F. Gomer Waterer's Knaphill Nursery, for shrubs.

Award of Merit.

To *Daphne sericea* (syn. *collina*) as a flowering shrub for alpine house and rock garden (votes unanimous), from Sir Wm. Lawrence, Bt., Burford. A small, pretty shrub 1 foot high. The leaves are obovate-lanceolate, 1 to 2 inches long, hairy beneath. Flowers rosy purple, arranged in terminal clusters of about a dozen.

Preliminary Commendation.

To *Berberis linearifolia* (votes unanimous), from Sir Wm. Lawrence, Bt., Burford (p. xxi).

To *Primula sonchifolia* (votes unanimous), from T. Hay, Esq., Hyde Park.

Other Exhibits.

Lady Aberconway and the Hon. H. D. McLaren, Bodnant: *Primula sp.* K.W. 4080, *Calochortus amoenus.*
R. C. Abdy, Esq., Harwich: *Arctotis sp.*
Messrs. Baker, Codsall: rock plants.
Cambria Nurseries, Cambridge: shrubs and alpine plants.
Mr. J. Hall, Cambridge: *Primula denticulata Hallii.*
Mr. Hemsley, Crawley: shrubs and rock plants.
Messrs. Ingwerson, East Grinstead: *Primula minima alba.*
Mr. H. G. Longford, Abingdon: alpine plants.
Marsden Nurseries, Ashtead: hardy plants.
Messrs. Maxwell & Beale, Broadstone: rock plants.
Mr. P. S. Patrick, Sevenoaks: shrubs.
Messrs. Redgrove, Borough Green: Primulas.
Messrs. Stewart, Ferndown: hardy plants.

April 21, 1931, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and sixteen other members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. Cutbush, Barnet, for shrubs.

To Messrs Prichard, Christchurch, for alpine plants.

Banksian Medal.

To Messrs. Baggesen, Tunbridge Wells, for Maples.

To R. Bevan, Esq., Henley, for alpine plants.

To Messrs. Elliott, Stevenage, for alpine plants.

To Messrs. Hillier, Winchester, for shrubs.

To Messrs. Low, Enfield, for shrubs and stove plants.

To Mr. R. C. Notcutt, Woodbridge, for shrubs.

To Mr. G. Reuthe, Keston, for shrubs.

To Messrs. Rogers, Southampton, for alpine plants.

To Messrs. Waterer, Bagshot, for shrubs and alpine plants.

To Mr. G. E. Welch, Cambridge, for shrubs and alpine plants.

To Messrs. Russell, Richmond, for stove plants.

Lindley Medal.

To Lady Loder, Horsham, for Camellias.

First-class Certificate.

To *Berberis linearifolia* as a hardy flowering shrub (votes unanimous), from Lt.-Col. Messel, O.B.E., Handcross. A variable plant, of which the best forms are magnificent. The arching branches are densely clothed with rich, dark green spiny leaves and generous pendent clusters of deep orange flowers, the outer segments and pedicels of which are crimson. It suggests an enlarged and glorified *B. Darwinii*.

To *Osmanthus Delavayi* as a hardy flowering shrub (votes unanimous), from Lionel de Rothschild, Esq., Exbury. The large branches exhibited could hardly have rewarded their cultivator more richly, being heavily laden with pure white, fragrant flowers : and as shown, *O. Delavayi* well deserves the award. It is a well-known shrub, and received the Award of Merit in 1914 and Award of Garden Merit on March 26, 1923.

Award of Merit.

To *Androsace cylindrica* as a flowering plant for the alpine house (votes 12 for), from R. Bevan, Esq., Henley-on-Thames. A rare species occurring on limestone at high altitudes in the Pyrenees. Its tiny green shoots form a dense, rounded tuft, bearing numerous, starry, white flowers.

To *Fritillaria imperialis rubra maxima* as a hardy flowering plant (votes 6 for), from F. C. Stern, Esq., Goring-by-Sea. A very fine ' Crown Imperial.' The massive stems rise to a height of 4 feet, bearing numerous broad, bright green leaves and a sub-terminal whorl of handsome orange-red flowers, surmounted by a tuft of narrower leaves.

To *Omphalodes Luciliae* as a hardy flowering plant for the rock garden (votes 13 for), from Messrs. Gething, Salisbury. A good specimen of this somewhat fastidious alpine plant was exhibited. When well-grown, its radiating, prostrate stems are well covered by oval, glaucous leaves and tipped by leafy racemes of flat, lavender-blue flowers.

To *Prunus serrulata* ' Tai Haku ' as a hardy flowering tree (votes 14 for), from Collingwood Ingram, Esq., Benenden. This is considered by some the finest single-flowered Cherry. The specimen shown, while not indicating the habit, displayed to advantage the pendulous clusters of large, snowy flowers.

Preliminary Commendation.

To *Calceolaria picta* as a greenhouse flowering plant (votes 7 for, 2 against), from The Director, University Botanic Garden, Cambridge. An herbaceous Chilean species. The branched inflorescence rises from a basal rosette of ovate-lanceolate leaves and bears many small, pale lilac flowers.

Other Exhibits.

R. G. Annesley, Esq., Castletownroche : *Clematis indivisa.*

Messrs. Baker, Codsall : shrubs and alpine plants.

Brookside Nurseries, Oxford : alpine plants.

Messrs. Burkwood & Skipwith, Kingston : shrubs.

Messrs. Elliott, Stevenage : *Primula magellanica.*

Mr. P. Gardner, Addingham : rock plants.

Mr. H. Hemsley, Crawley : rock plants.

Hocker Edge Gardens, Cranbrook : rock plants.

Collingwood Ingram, Esq., Benenden : *Prunus subhirtella grandiflora, P. Amygdalus* × *persica.*

Messrs. Low & Co., Enfield : *Columnea Banksii.*

Marsden Nurseries, Ashtead : hardy plants.
Messrs. Maxwell & Beale, Broadstone : rock plants.
Lt.-Col. Messel, Handcross : *Cassia stipulacea.*
Mr. P. S. Patrick, Sevenoaks : shrubs.
Messrs. Prichard, Christchurch : Cheiranthus ' Rufus.'
Mr. J. Robinson, New Eltham : alpine plants.
F. C. Stern, Esq., Goring-by-Sea : *Scilla messiniaca.*
T. Hay, Esq., Hyde Park : *Trollius acaulis.*
Mr. H. Ward, Southgate : *Lithospermum prostratum* ' Grace Ward.'
Messrs. Watson, Killiney : *Berberis Darwinii rubens.*

May 5, 1931, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and twenty-one other members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. Cheal, Crawley, for shrubs.
To Messrs. Elliott, Stevenage, for alpine plants.

Banksian Medal.

To Messrs. Ladhams, Southampton, for shrubs and rock plants.
To Messrs. Low, Enfield, for stove plants and shrubs.
To Marsden Nurseries, Ashtead, for hardy plants.
To Mr. R. C. Notcutt, Woodbridge, for shrubs.
To Messrs. Prichard, Christchurch, for hardy plants.
To Messrs. Rogers, Southampton, for rock plants.
To Messrs. Russell, Richmond, for stove plants.
To Messrs. Waterer, Twyford, for hardy plants.

First-class Certificate.

To *Meconopsis regia* as a hardy flowering plant (votes 13 for, 3 against), from T. Hay, Esq., Hyde Park. A very beautiful Nepalese species, discovered in 1928 at altitudes of 14,000 to 15,000 feet. It is probably biennial, and forms in its first winter a handsome rosette of silvery, oblanceolate leaves. The inflorescence is very leafy and reaches a height of 4 or 5 feet, the massive, sulphur-yellow flowers developing in the upper leaf-axils.

Award of Merit.

To *Berberis lologensis* as a hardy flowering shrub (votes 14 for), from Lt.-Col. L. C. R. Messell, O.B.E , Handcross. A fine evergreen shrub said to be a natural hybrid. It is a South American plant of the Darwinii series, closely resembling in colouring, though not rivalling, the related *B linearifolia*

To *Cydonia japonica* var. ' Phylis Moore ' as a hardy flowering shrub (votes 14 for), from Messrs. F. Gomer Waterer's Knaphill Nursery, Ltd. A very choice semi-double variety of a popular shrub. The flowers are freely produced in clusters. They are large and solid, and their dainty petals display many shades of pink.

To *Prunus serrulata erecta* ' Ama-na-gawa ' as a hardy flowering tree (votes unanimous), from Mr. R. C. Notcutt, Woodbridge. An erect-growing Cherry of vigorous growth. The flowers are of good shape, semi-double, lasting, and pale blush-pink in colour.

To *Ranunculus creticus* as a hardy flowering plant (votes 9 for, 3 against), from G. P. Baker, Esq., Sevenoaks. A large-flowered rich yellow Buttercup. The flowers reach a height of 1 foot, overtopping the large, lobed, cordate leaves.

Preliminary Commendation.

To *Olearia stellulata* var. *splendens* as a half-hardy flowering shrub (votes unanimous), from, E. M. Preston Esq., Hayes, Kent. A charming Tasmanian shrub, probably not hardy, but very attractive when spreading its mauve stars above the neat tomentose foliage.

Other Exhibits.

Messrs. Barr, Taplow : hardy plants.
Messrs. Baker, Codsall : hardy plants.
Mr. G. R. Downer, Chichester : hardy plants.
Mr. P. Gardner, Addingham : hardy plants.
Mr. A. Hansen, New Barnet : *Viola bosniaca* × *cornuta.*
T. Hay, Esq., Hyde Park : *Geranium caespitosum.*
Hocker Edge Gardens, Cranbrook : alpine plants.
Misses Hopkins, Coulsdon : hardy plants.
Collingwood Ingram, Esq., Benenden : *Prunus serrulata nobilis.*
Sir William Lawrence, Bt., Burford : *Lithospermum fruticosum, Aesculus neglecta, Richardia Rehmanii, Hippeastrum Reginae.*
Messrs. Maxwell & Beale, Broadstone : hardy plants.
Lt.-Col. Messel, Handcross : *Calceolaria sp.* (Elliott).

Mr. P. S. Patrick, Sevenoaks : shrubs.
Messrs. Redgrove, Borough Green : hardy plants.
Mr. J. Robinson, New Eltham : hardy plants.
Messrs. Stewart, Ferndown : shrubs.
Capt. Symons-Jeune, Old Windsor : Saxifraga 'Tumbling Waters.'
Mr. G. E. Welch, Cambridge : alpine plants.

May 19, 1931, Mr. W. J. BEAN, I.S.O., in the Chair, and twenty other members present.

Awards Recommended :—

First-class Certificate.

To *Magnolia sinensis* as a hardy flowering tree (votes 14 for, 1 against), from Messrs. R. Veitch & Son, Exeter. This species received the Award of Merit in 1927, when exhibited as *M. Nicholsoniana*. It is a deciduous tree, reaching a height of 20 feet, and bearing soft, pale green leaves, downy beneath. The large white flowers are pendulous and open widely to display their crimson stamens.

Award of Merit.

To *Azara lanceolata* as a hardy flowering shrub (votes unanimous), from Lt.-Col. L. C. R. Messel, O.B.E., Handcross. A very bright and elegant Chilean shrub. The flowering branches spread widely from the erect stem and are covered evenly with small, lanceolate, glossy leaves and axillary clusters of little golden flowers.

To *Anacyclus depressus* as a flowering plant for the alpine house (votes unanimous), from Mr. W. E. Th. Ingwerson, East Grinstead. A small, prostrate Composite from Morocco. The short stems radiate from a thick tap-root, each bearing many small pinnate leaves and a solitary flowerhead. The rays, ten to twelve in number, are broad, white within, banded externally with red.

To *Actinidia Kolomikta* as a hardy flowering shrub (votes 13 for, 2 against), from Viscountess St. Cyres, Lymington. A slender, deciduous, climbing shrub of rapid growth. Leaves 4 inches long, ovate, acuminate, sharply and irregularly serrate ; many of them changing, in the upper half of their length, from green to white and later to deep rosy-purple. Flowers white, inconspicuous, but deliciously fragrant.

To *Campanula Cecilii* as a half-hardy flowering plant (votes unanimous), from Sir E. Cecil and Lady Cecil, Poole. A remarkable species raised from seed collected in Kurdistan in 1930. It is a bushy plant 1 foot high with broad-lanceolate leaves. The flowers are large, widely expanded with spreading corollalobes. The colour is red-purple, deeper at the base and lined with dark blue.

To *Cytisus* ' Porlock ' as a hardy flowering shrub (votes 14 for), from N. G. Hadden, Esq., West Porlock. A hybrid raised by crossing *C. monspessulanus* with *C. ramosus*. The leafy branches bore abundant clusters of bright yellow flowers, and suggested a desirably compact habit of growth.

To *Dierվilla Middendorfiana* as a hardy flowering shrub (votes unanimous), from Sir William Lawrence, Bt., Burford. A vigorous Chinese species of erect habit. The campanulate, sulphur-yellow flowers are produced freely on short lateral growths, and the lower segments of the corolla are spotted with orange. This species is figured at t. 7876 of the *Botanical Magazine*.

To *Dryandra formosa* as a tender flowering shrub (votes 8 for), from Major Dorrien-Smith, Tresco Abbey, Scilly. An interesting Proteaceous shrub from extra-tropical Australia. The pinnatisect leaves are numerous and spread stiffly from the stem. An interesting account of a suggested mode of pollination of the terminal orange-coloured flower-heads of Dryandra by kangaroos is given in ' Natural History of Plants ' (Kerner & Oliver), vol. 2, p. 230.

To *Exochorda Wilsonii* as a hardy flowering shrub (votes unanimous), from Mr. R. C. Notcutt, Woodbridge. This is considered by Rehder a variety of *E. Giraldii*, which it closely resembles. It is a most desirable shrub of erect habit and vigorous growth. The delicate green foliage forms an appropriate background for the long racemes of large, snow-white flowers, each 2 inches in diameter.

To *Juniperus squamata* var. *Meyeri* as a hardy evergreen shrub (votes 14 for), from Messrs. C. B. van Nes, Boskoop. A very handsome erect shrub of dense habit. The undersides of its minute, lanceolate leaves are very glaucous and add greatly to its charm.

To *Metrosideros diffusa* as a tender flowering shrub (votes 13 for), from Major Dorrien-Smith, Tresco Abbey. A Myrtaceous plant from the North Island of New Zealand. It is a rigid or semi-scandent shrub bearing small, oblong, coriaceous leaves and terminal cymes of deep pink, long-stamened flowers.

To *Paeonia cretica* as a hardy flowering plant (votes unanimous), from G. P. Baker, Esq., Sevenoaks. The specimens exhibited bore large, cup-shaped blossoms of exquisite texture and ivory-white colouring on stiff stems clothed with dark, divided foliage.

To *Paeonia Moutan* var. 'Nippon Ko' as a hardy flowering shrub (votes 11 for), from Sir Wm. Lawrence, Bt., Burford. A large-flowered 'Tree Pæony.' Flowers white, slightly suffused creamy pink in the centre.

To *Paeonia Moutan* var. 'The Tycoon' as a hardy flowering shrub (votes 9 for, 3 against), from Sir Wm. Lawrence, Bt. Flowers smaller than those of the preceding variety, bright, soft pink, centre of somewhat deeper tint.

To *Pittosporum tenuifolium* as a half-hardy flowering shrub (votes 7 for, 3 against), from the Duke of Richmond and Gordon, Chichester. A good evergreen shrub for warm localities. It is of elegant, symmetrical growth. The obovate leaves are lustrous, light green, and have undulating margins. The small, chocolate flowers are produced freely in the leaf-axils.

To *Pultenaea rigida* as a tender flowering shrub (votes 10 for), from Major Dorrien-Smith, Tresco Abbey. A small, leguminous shrub with virgate branches and linear leaves. The rather inconspicuous, orange flowers are borne in lateral clusters.

To *Solanum valdiviense* as a hardy flowering shrub (votes unanimous), from Lt.-Col. L. C. R. Messel, O.B.E. A free-flowering, bushy shrub. The slender growths bear many small, lanceolate leaves and lateral clusters of violet flowers.

Preliminary Commendation.

To *Berberis montana* (votes unanimous), from Lt.-Col. Messel.

To *Primula latisecta* (votes unanimous), from Messrs. Oliver and Hunter, Moniaive.

To *Primula microphylla* (votes 10 for, 1 against), from Dr. Macwatt, Duns.

To *Saxifraga* 'Wonder' (votes 9 for), from Mrs. Lloyd Edwards, Wrexham.

Cultural Commendation.

To Mr. J. Comber, gardener to Lt.-Col. Messel, for *Erica australis* var. 'Mr. Robert.'

To Mr. W. Fleming, gardener to Col. S. R. Clarke, Haywards Heath, for *Sarmienta repens.*

Selected for trial at Wisley.

Arctotis laevis, A. radula, A. aspera and six unnamed species, from Major Dorrien-Smith, Tresco Abbey.

Other Exhibits.

R. G. Annesley, Esq., Castletownroche: *Dendromecon rigidum, Clematis macropetala.*

Donard Nursery Co., Newcastle: Pernettya 'Bell's Seedling,' Cydonia 'Rowallane Seedling.'

T. Hay, Esq., Hyde Park: Meconopsis 'Glen Devon hybrid.'

Mrs. Joy, Bentley: Musk.

Sir Wm. Lawrence, Bt., Burford: *Paeonia* × *Wittwiczii, Wistaria venusta alba, Piptanthus nepalensis, Berberis empetrifolia, Dudleya pulverulenta.*

Dr. Macwatt, Duns: *Primula Parryi.*

R. C. Norman, Esq., Moor Park: *Rosa Hugonis.*

Messrs. Otto, Boskoop: *Chamaecyparis Lawsoniana Forsteckiana* var. *glauca.*

Mrs. Roper, Chard: Primula 'Forde Abbey Seedling,' *Lathyrus pubescens.*

Major A. Dorrien-Smith, Tresco Abbey: *Kennedya nigricans, Leucopogon Richei, Corokea buddleioides, Diosma uniflora.*

F. C. Stern, Esq., Goring-by-Sea: *Berberis pemakoensis.*

Messrs. Sutton & Sons, Reading: *Streptocarpus sp.*

Messrs. Wallace, Tunbridge Wells: *Lilium* × *Davimottiae.*

Messrs. Watson, Killiney: hybrid Brooms.

June 2, 1931, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and twenty-two other members present.

Awards Recommended:—

Silver Banksian Medal.

To Mr. R. C. Notcutt, Woodbridge, for shrubs.

Banksian Medal.

To Messrs. Burkwood & Skipwith, Kingston, for shrubs.

To Messrs. Casburn & Bedford, Cambridge, for rock plants.

To Messrs. Cheal, Crawley, for shrubs.

To Messrs. Elliott, Stevenage, for alpine plants.

To Messrs. Low, Enfield, for shrubs and stove plants.

To Messrs. Maxwell & Beale, Broadstone, for rock plants.

To Messrs. Pennell, Lincoln, for Clematis.

To Messrs. Prichard, Christchurch, for rock plants.
To Messrs. Russell, Richmond, for rock plants.
To the Southgate Nurseries, N. 14, for Azaleas.
To Messrs. Waterer, Twyford, for rock plants.
To Mr. G. E. Welch, Cambridge, for rock plants.

Lindley Medal.

To the John Innes Hort. Inst., Merton Park, for a collection of Nemesia species.

Award of Merit.

To *Anemone tetrasepala* as a hardy flowering plant (votes unanimous), from T. Hay, Esq., Hyde Park. A Western Himalayan species similar in appearance to the better-known *Anemone narcissiflora*, from which it differs in the fewer perianth-segments. The divided and toothed leaves are pale green: the creamy-white flowers 2 inches across, in graceful, branched cymes, on stems 18 inches high.

To *Campanula Formanekiana* as a hardy flowering plant (votes 11 for, 1 against), from Dr. P. L. Giuseppi, Felixstowe. A rare and beautiful species from Greece. It forms a basal rosette of small, hairy leaves from which rises the erect, leafy inflorescence. The large, opaque white flowers are widely expanded.

To *Geranium subcaulescens* as a flowering plant for rock garden or alpine house (votes 11 for, 4 against), from Mr. W. E. Th. Ingwerson, East Grinstead. A small-growing Macedonian species. The flowers are rose-pink with darker venation; the leaves finely divided and covered with soft hairs.

To *Crataegus dsungarica* as a hardy flowering tree (votes 12 for), from Sir Wm. Lawrence, Bt., Burford. A species of the Eastern Asiatic group Sanguineae. The leaves are about 3 inches long, variously lobed and slightly toothed. Flowers over ½ inch across, in loose clusters.

To *Potentilla coriandrifolia* as a flowering plant for the rock garden or alpine house (votes 18 for), from T. Hay, Esq., Hyde Park. A very charming little plant. The finely-cut lanceolate leaves form a basal tuft from which rise slender, purple-tinted flower-stalks, each bearing a white, dark-centred flower with a red spot at the base of each petal.

To *Rosa* × *cantabrigiensis* as a hardy flowering shrub (votes unanimous), from the Director, University Botanic Garden, Cambridge. A hybrid Rose raised from the cross *R. Hugonis* × *R. sericea*. It resembles the former species, except that its flowers are somewhat larger and paler.

To *Syringa* 'Danton' as a hardy flowering shrub (votes 13 for), from Mr. R. C. Notcutt, Woodbridge. A very fine, single-flowered hybrid Lilac. The panicles are large, the flowers of good substance and a dark reddish colour.

To *Syringa villosa* as a hardy flowering shrub (votes 15 for), from F. C. Stern, Esq., Goring-by-Sea. A bushy shrub reaching a height of 10 feet. Leaves large, oblong, dark green above and pale beneath. Flowers in long, dense panicles, pale rosy-lilac or whitish. Native of N. China.

Cultural Commendation.

To Mrs. Bucknall, Doneraile, for *Habranthus pratensis*.

To Mr. Geo. Taylor, gardener to Sir John Ramsden, Bt., Gerrards Cross, for *Nomocharis sp.* K.W. 5809.

Other Exhibits.

R. Bevan, Esq., Henley-on-Thames: *Campanula Hawkinsiana.*
Dr. E. J. Collins, Merton: Calceolaria 'Charm.'
Messrs. Goodliffe, Bishops Stortford: shrubs and rock plants.
Hocker Edge Gardens, Cranbrook: rock plants.
Dr. P. L. Giuseppi, Felixstowe: *Rhodohypoxis Baurii platypetala, Ilex Mariesii, Campanula rupestris.*
Mr. A. Hansen, New Barnet: rock plants.
Mr. H. Langridge, Westerham: rock plants.
Sir Wm. Lawrence, Bt., Burford: *Gladiolus sp., Calceolaria sp., Philadelphus sp.*
Lt.-Col. L. C. R. Messel, O.B.E., Handcross: *Tulipa Sprengeri, Lonicera sp., Deutzia sp.*
Lt.-Col. G. S. F. Napier, Horeham Road: hybrid Liliums.
Mr. R. C. Notcutt, Woodbridge: *Calycotome infesta.*
Mr. P. S. Patrick, Sevenoaks: shrubs.
H. S. Pochin, Esq., Croft: *Brodiaea Bridgesii.*
Messrs. L. R. Russell, Ltd., Richmond: Gardenia 'Commander Vitton Stringer.'
Mr. S. Sims, Draycott: rock plants.
Ingham Whitaker, Esq., Lymington: *Rheum sp.* K.W. 7101.
Miss E. Willmott, Great Warley: *Sorbus sp.*

June 16, 1931, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and nineteen other members present.

Awards Recommended:—

Silver-gilt Banksian Medal.

To Captain Symons-Jeune, Old Windsor, for *Saxifraga* 'Tumbling Waters.'

Silver Banksian Medal.

To Mr. Amos Perry, Enfield, for hardy plants.

Banksian Medal.

To Central Garden Supplies, Kenton, for dwarf conifers.

To Messrs. Cheal, Crawley, for shrubs.

To Messrs. Maxwell & Beale, Broadstone, for rock plants.

To Messrs. Prichard, Christchurch, for rock plants.

To Messrs. Russell, Richmond, for rock plants.

To Messrs. Waterer, Twyford, for rock plants.

To Mr. G. E. Welch, Cambridge, for rock plants.

First-class Certificate.

To *Paeonia* 'L'Espérance' as a hardy flowering plant (votes unanimous), from Hiatt C. Baker, Esq., Almondsbury. A variety of the hybrid *P. Lemoinei* (*P. lutea* × *P. suffruticosa*). It is shrubby and bears large, semi-double flowers with about ten soft yellow petals flushed with pink and blotched at the base. The open centre is occupied by a cluster of red, golden-anthered stamens.

Award of Merit.

To *Chionanthus virginicus* as a hardy flowering shrub (votes unanimous), from Mr. F. Gomer Waterer's Knaphill Nurseries, Ltd., Woking. A handsome and graceful deciduous shrub or small tree. The leaves are large, ovate-oblong, dark green above and paler beneath, and in the specimens shown were nearly hidden by the numerous feathery panicles of narrow-petalled white flowers. The leaves turn yellow in autumn, and the pistillate plant bears ornamental, dark blue fruits.

To *Cytisus Battandieri* as a hardy flowering shrub (votes 16 for), from T. Hay, Esq., Hyde Park. Leaves large, trifoliolate, dark green, densely hairy beneath. Flowers yellow, in short, compact racemes.

To *Deutzia* 'Contraste' as a hardy flowering shrub (votes unanimous), from Mrs Leverton Harris, Moreton-in-the-Marsh, and Mr. R. C. Notcutt, Woodbridge. A large-flowered hybrid Deutzia, with white flowers heavily striped externally with rose and arranged in large, semi-pendulous panicles. Leaves large, dark green.

To *Gladiolus* × *grandi-latus* as a tender flowering plant (votes unanimous), from Mr. Amos Perry, Enfield. A hybrid raised from the cross *G. grandis* × *G. alatus*. It is a small plant with long, narrow leaves and short spikes of flowers. The upper segments are suffused with pink on an orange ground, the lower ones yellow, tipped with orange.

To *Lonicera* × *Tellmanniana* as a hardy flowering shrub (votes unanimous), from Sir Wm. Lawrence, Bt., Burford. The parentage of this hybrid Honeysuckle is *L. tragophylla* × *L. sempervirens superba*, and it was raised by Herr Gy. Magyar, of the Royal Hungarian Gardeners' College, Budapest. It has large, grey-green leaves, connate below the terminal flower-clusters. The long tubular flowers are widely expanded above, deep butter-yellow flushed with red.

To *Lilium columbianum* as a hardy flowering plant (votes unanimous), from T. Hay, Esq., Hyde Park. A small, hardy, American Lily. The plant is 2–4 feet high, bearing several whorls of leaves and a branched head of flowers. These are orange-yellow, spotted purple-brown. Similar in colouring to *L. Humboldtii*, but altogether smaller.

To *Magnolia globosa* as a hardy flowering tree (votes unanimous), from the Rt. Hon. the Earl of Stair, Castle Kennedy. A deciduous species allied to *M. parviflora*, forming a tree to 40 feet high. The large, ovate leaves are dark green above and covered with fulvous pubescence beneath. Flowers rounded, of solid texture, pure white, stamens bright red.

To *Neillia longiracemosa* as a hardy flowering shrub (votes 15 for, 3 against), from Reginald Cory, Esq., Cardiff, and Sir Wm. Lawrence, Bt., Burford. A slender, deciduous shrub with small, lobed and doubly serrate leaves pubescent beneath. The flowers are carried in terminal racemes, very small and dainty, pink within, darker externally.

To *Wistaria floribunda macrobotrys alba* as a hardy flowering shrub (votes unanimous), from Reginald Cory, Esq., Cardiff. *Wistaria floribunda* var. *macrobotrys* is the hardy climber usually grown under the name *W. multijuga*. The present plant differs only in its white flowers tinted with pink on the keel. A most beautiful plant.

Preliminary Commendation.

To *Daboecia azorica* (votes unanimous), from E. F. Warburg, Esq., Headley.

To *Gladiolus* × *vinu-latus* (votes 9 for), from Mr. Amos Perry, Enfield.

Other Exhibits.

Messrs. Burkwood & Skipwith, Kingston: shrubs.

R. Cory, Esq., Cardiff: *Syringa Adamiana.*

The Countess of Dunraven, Adare: *Lilium regale.*

Mr. P. Gardner, Addingham: rock plants.

Dame Alice Godman, D.B.E., Horsham: *Aloe aristata.*

Mr. A. Hansen, New Barnet: rock plants.

Sir Wm. Lawrence, Bt., Burford: *Verbascum plicatum.*

Messrs. Low & Co., Enfield: stove plants.

R. C. Mitcheson, Esq., Woolton, I.O.W.: *Arisaema speciosum, A. candidissimum.*

Messrs. Carter Page, London Wall: rock plants.

Mr. P. S. Patrick, Seal: shrubs.

Mr. Amos Perry, Enfield: *Polemonium occidentale.*

Messrs. Rogers, Southampton: rock plants.

F. C. Stern Esq., Goring-by-Sea: *Allium Murrayanum.*

Southgate Nurseries, N. 14: Azaleas.

Major G. H. Tristram, Westerham: *Rosa Webbiana.*

Messrs. Wallace, Tunbridge Wells: *Primula burmanica rosea.*

Messrs. Watkins & Simpson, Covent Garden: *Mimuplexus.*

June 23, 1931, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and twenty other members present.

Awards Recommended:—

First-class Certificate.

To *Clusia grandiflora* as a flowering plant for the stove (votes 8 for, 3 against), from Sir Wm. Lawrence, Bt., Burford. A tropical American, dioecious shrub said to be epiphytic on large trees and to reach a height of 20 feet. The opposite, coriaceous leaves are a foot long. The inverted flowers appear in inverted cymes of two or three. In the male form exhibited the flower is 6 inches across; petals 8, white with rosy margins, forming a shallow basin with a central golden, mucilaginous disc surrounded by about 500 stamens. A very rare and striking plant.

Award of Merit.

To *Pentstemon azureus* as a hardy flowering plant (votes 16 for, 1 against), from Lt.-Col. L. C. R. Messel, O.B.E., Handcross. A useful species for the rock garden; about 2 feet high, with slender, leafy panicles of narrow, tubular flowers. The colour is a combination of clear azure-blue with reddish-purple.

To *Deutzia mollis* as a hardy flowering shrub (votes 6 for, 2 against), from Sir Wm. Lawrence, Bt., Burford. Leaves large, ovate, finely toothed, softly hairy, especially beneath. Flowers small, white, in dense corymbs 3 inches across. A distinct Deutzia, but less ornamental than most of the hybrids.

To *Pimelea longifolia* as a tender flowering shrub (votes 15 for, 1 against), from G. W. E. Loder, Esq., Ardingly. A small Australian shrub which has been in cultivation for many years. It forms an erect bush with neat leafy stems and dense heads of small, white flowers.

To *Lilium nepalense* as a hardy flowering plant (votes unanimous), from Lt.-Col. L. C. R. Messel, O.B.E., Handcross. In 1888, a Lily sent from Upper Burmah and flowered by Messrs. Hugh Low, received the F.C.C. when shown under the name *L. nepalense.* It is now tolerably certain that the plant exhibited was *L. ochraceum,* and that the true *L. nepalense,* although evidently introduced to cultivation about the year 1855, was subsequently lost until recently re-introduced. The confusion was due to a superficial similarity, but E. H. Wilson clearly indicates their systematic differences in his 'Lilies of Eastern Asia' (1925), pp. 18, 61.

To *Lilium umbellatum* var. 'Mahogany' as a hardy flowering plant (votes 15 for), from Messrs. R. Wallace, Tunbridge Wells. An easily grown garden Lily. The stems are 18 inches high, clothed with many narrow leaves, and each supports three or four large, erect, mahogany-coloured flowers.

To *Ursinia pulchra* as a half-hardy flowering annual (votes unanimous), from T. Hay, Esq., Hyde Park. A charming South African annual Composite. The plants are bushy, with finely-cut rich green leaves, and solitary flower-heads on long stalks. The rays are bright orange, narrowly lanceolate, with a zone of black surrounding an orange disc.

Other Exhibits.

Col. Barchard, Uckfield: *Lilium bulbiferum brenchleyense.*

Messrs. Burkwood & Skipwith, Kingston: *Philadelphus* × *Burkwoodii.*

The Dowager Countess Cawdor, Haslemere : *Cornus Kousa.*
E. A. Jamieson, Esq., Edinburgh : *Lupinus moroccensis.*
G. W. E. Loder, Esq., Ardingly : *Idesia polycarpa.*
Lt.-Col. L. C. R. Messel, Handcross : *Kolkwitzia amabilis.*
Major A. Pam, Broxbourne : *Tripterygium Regelii.*
Rt. Hon. Lord Swaythling, Southampton : Lilium ' Sutton Court Seedling.'
Messrs. Wallace, Tunbridge Wells : *Lilium davuricum luteum.*

June 30, 1931, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and twenty-one other members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. Wallace, Tunbridge Wells, for Liliums.

Banksian Medal.

To Messrs. Maxwell & Beale, Broadstone, for rock plants.

To Mr. Amos Perry, Enfield, for hardy plants.

To Messrs. Russell, Richmond, for Nymphaeas.

Award of Merit.

To *Deutzia crenata erecta* as a hardy flowering shrub (votes unanimous), from Lionel de Rothschild, Esq., Exbury. This variety produces erect, stiff stems from which arise a regularly decussate series of short, lateral growths each bearing a dense, conical cluster of white flowers.

To *Salvia Coeli* as a hardy flowering plant (votes unanimous), from C. T. Musgrave, Esq., Godalming. An herbaceous species reaching a height of 3 to 4 feet, producing branched racemes of large blue, white-spotted flowers. No foliage was exhibited.

Preliminary Commendation.

To *Lupinus californicus* as a hardy flowering plant (votes 8 for, 3 against), from Viscountess Byng of Vimy, Thorpe-le-Soken.

To *Roella ciliata* (votes 11 for), from Viscountess Byng of Vimy. A most charming, tender sub-shrub from the Cape. It is of Ericoid habit and foliage, but surprisingly becomes a Campanula at flowering-time. Its erect flowers with widely-spreading corolla-lobes are zoned in a remarkable manner with velvety-purple, white and blue.

Other Exhibits.

Viscountess Byng of Vimy : *Eriogonum arborescens, Pelargonium sp.*
Central Garden Supplies, Kenton : dwarf shrubs.
Mr. A. Hansen, New Barnet : rock plants.
Collingwood Ingram, Esq., Benenden : *Gladiolus sp. aff. G. cuspidatus.*
Messrs. Ingwerson, Ltd., East Grinstead : *Anthemis sanctajohannis.*
Messrs. Kelway, Langport : *Gladiolus alatus, Chrysanthemum Vivellii, Dimorphotheca ringens.*
Sir Wm. Lawrence, Bt., Burford : *Selago serrata, Gentiana straminea, Lonicera splendida, Lilium candidum,* Salonika form.
Messrs. Low & Co., Enfield : stove plants.
W. W. Matthews, Esq., Tavistock : *Echium vulgare.*
Mr. A. Perry, Enfield : *Campanula Porscharskyana, Eriophorum latifolium, Digitalis* hybrids.
Mr. G. Reuthe, Keston : *Rhododendron discolor.*
Lionel de Rothschild, Esq., Exbury : Rhododendron ' Norman Shaw.'
F. C. Stern, Esq., Goring-by-Sea : Primula ' Highdown.'
Messrs. Wallace, Tunbridge Wells : *Lilium umbellatum* ' Vermilion Brilliant,' *Veronica Barkeri, Iris Delavayi* × *Clarkei.*

July 14, 1931, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and twenty-one other members present.

Awards Recommended :—

Gold Medal.

To Messrs. Russell, Richmond, for stove plants.

Silver-gilt Banksian Medal.

To Mr. W. A. Constable, Paddock Wood, for Lilies.

To Messrs. Wallace, Tunbridge Wells, for Lilies.

Silver Banksian Medal.

To Messrs. Hillier, Winchester, for shrubs.

Banksian Medal.

To Messrs. Low, Enfield, for stove plants.

Lindley Medal.

To Lt.-Col. L. C. R. Messel, O.B.E.,' Handcross, for a group of *Triptilion spinosum.*

First-class Certificate.

To *Haemanthus Katherinae* as a greenhouse flowering plant (votes 13 for), from the Director, Royal Botanic Gardens, Kew. A noble species introduced from Natal and described by Baker in *Gard. Chron.*, 1877, p. 656. It produces a head of bright, pale green, undulate leaves a foot long and 4 to 5 inches broad. The scape, which arises outside the foliage-cluster, is tall and massive, and bears a spherical umbel, 9 inches across, of long-tubed, scarlet flowers with exserted stamens.

Award of Merit.

To *Grindelia speciosa* as a hardy flowering plant (votes unanimous), from Sir Wm. Lawrence, Bt., Burford. A pretty South American Composite with showy flower-heads on strong stalks 2 feet long. The yellow ray florets are 1½ inch long, surrounding a disc of darker colouring.

To *Lilium* × *Davimottiae* as a hardy flowering plant (votes unanimous), from Viscountess Byng of Vimy. A most graceful and beautiful hybrid of *Lilium Davidii* × *L. Willmottiae*. The specimen shown bore over fifty flowers and buds. The plentiful leaves are dark green, long and narrow; the flowers of medium size, disposed in a spreading panicle, bright orange-scarlet, the perianth segments strongly reflexed.

To *Lilium Heldreichii* as a hardy flowering plant (votes unanimous), from Sir Wm. Lawrence, Bt. A rare European species 2 feet high, with glossy, dark green leaves and one or two terminal flowers. The perianth segments are recurved for one-half their length, bright sealing-wax red within and paler externally.

To *Stuartia pentagyna* var. *grandiflora* as a hardy flowering shrub (votes unanimous), from Lt.-Col. L. C. R. Messel, O.B.E., Handcross. A beautiful shrub which reaches a height of 10 or 12 feet. Leaves ovate, light green. Flowers large, saucer-shaped, borne singly in the leaf-axils, with broad, white petals and a central cluster of reddish stamens.

Preliminary Commendation.

To *Lobelia campanulata* (votes unanimous), from Messrs. Ryder, St. Albans. A small, semi-prostrate species from Namaqualand. The slender, spreading shoots are much branched and bear narrow, serrate leaves and rounded, violet flowers on long peduncles. To be treated like the bedding Lobelias.

Selected for Trial at Wisley.

Delphinium nudicaule splendens, from Mr. A. Young, Garmouth, Elgin.

Other Exhibits.

Central Garden Supplies, Kenton: dwarf conifers.

W. N. Craig, Esq., Weymouth, Mass.: Lilium × 'W. N. Craig.'

W. Hales, Esq., Chelsea Physic Garden: *Olea europea.*

Mr. A. Hansen, New Barnet: rock plants.

T. Hay, Esq., Hyde Park: *Sutera linifolia, Michauxia campanuloides.*

The Hon. Robert James, Richmond: Lilium 'St. Nicholas.'

E. A. Jamieson, Esq., Edinburgh: *Lupinus moroccensis.*

The Director, John Innes Hort. Inst., Merton: *Streptocarpus Holstii.*

Lt.-Col. L. C. R. Messel, O.B.E., Handcross: *Escallonia leucantha, Stephanandra* sp.

Mrs. Maurice Pope, Chippenham: *Mackaya bella.*

Lt.-Col. G. S. F. Napier, Horeham Road: *Lilium pardalinum* × *Parryi.*

Messrs. Wallace, Tunbridge Wells: *Tilia platyphyllos* var. *laciniata, Philadelphus Lewisii.*

Mr. W. Wells, Jun., Merstham: *Linaria origanifolia.*

July 28, 1931, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and nineteen other members present.

Awards Recommended:—

Silver Banksian Medal.

To the Donard Nursery Co., Newcastle, for hybrid Dieramas.

Banksian Medal.

To Mr. W. A. Constable, Paddock Wood, for Liliums.

To Mr. Amos Perry, Enfield, for hybrid Hemerocallis.

To Mr. G. Reuthe, Keston, for shrubs.

Award of Merit.

To *Desfontainea spinosa* as a hardy flowering shrub (votes unanimous), from Sir John Ramsden, Bt., Gerrard's Cross. A very handsome evergreen shrub, best suited to warm localities. The foliage resembles that of the common Holly, and is dark green with a glaucous sheen. The pendent flowers are terminal on short, lateral twigs; corolla 2 inches long, tubular, scarlet, tipped with yellow.

To *Hydrangea serrata* var. *acuminata* as a hardy flowering shrub (votes 11 for, 1 against), from Messrs. Baker, Codsall. A small, compact shrub with erect, branched stems bearing ovate-lanceolate, serrate leaves 4 to 5 inches long, and medium-sized, flat corymbs of purplish-pink flowers. The clusters are partially surrounded by sterile flowers of a bluish shade.

To *Orpheum frutescens* as a flowering plant for the cool greenhouse (votes 15 for), from Sir Wm. Lawrence, Bt., Burford. A South African species of Gentianaceae. It is a branching plant 2 to 3 feet high, with fleshy, oblong-linear, hairy leaves and terminal flowers 1½ inch across. The obovate petals are spreading, bright rosy-pink with a central cluster of golden stamens.

To *Watsonia Foucardii* as a tender flowering plant (votes 12 for), from Collingwood Ingram, Esq., Benenden. A tall-growing species with narrow-tubular flowers. The tube is pale orange-coloured, the spreading perianth-lobes pale pink.

To *Schizophragma hydrangeoides* as a hardy flowering shrub (votes unanimous), from Mark Fenwick, Esq., Stow-on-the-Wold. A handsome woody climber, often confused, on account of a superficial resemblance, with *Hydrangea petiolaris*. Leaves orbicular-ovate, glossy. Flowers small, creamy-white, in large flat, terminal corymbs, surrounded by a number of whitish, ovate bracts.

Selected for trial at Wisley.

Hemerocallis 'Cissy Giuseppi,' 'Viscountess Byng' and 'E. A. Bowles,' from Mr. Amos Perry, Enfield.

Other Exhibits.

Mr. W. F. Armstrong, Gunnersbury Park: *Tibouchina semidecandra.*

G. P. Baker, Esq., Sevenoaks: *Campanula versicolor* var. *thessalica.*

Messrs. Bunyard, Maidstone: rock plants.

The Hon. Vicary Gibbs, Elstree: *Viburnum tomentosum.*

Mr. A. Hansen, New Barnet: rock plants.

Messrs. Kelway & Son, Langport: *Teucrium orientale, Gladiolus dracocephalus, G. Ecklonii.*

Mrs. Philip Martineau, Ascot: *Salvia Sclarea.*

Lt.-Col. Napier, Horeham Road; *Lilium Duchartrei, L.* × *princeps.*

JOINT RHODODENDRON COMMITTEE.

March 24, 1931, Mr. G. W. E. LODER, F.L.S., in the Chair, and seven other members present.

Awards Recommended :—

First-class Certificate.

To *Rhododendron* ' Flame,' as a tender flowering shrub (votes unanimous), from the Earl of Morley, Tetbury. A magnificent *javanicum* hybrid. The young plant exhibited carried one large terminal cluster of flowers. The corolla is widely funnel-shaped, the limb flattened with rounded lobes. The colour is an intensely rich orange-scarlet.

Other Exhibit.

G. W. E. Loder, Esq., Ardingly : *Rhododendron sutchuenense* var. *Geraldii.*

April 8, 1931, W. J. BEAN, Esq., I.S.O., in the Chair, and six other members present.

Awards Recommended :—

Award of Merit.

To *Rhododendron aperantum* as a hardy flowering shrub (votes unanimous), from the Marquess of Headfort, Kells. Forrest 27075, 27597. Series Neriiflorum, Sub-series Sanguineum. A dwarf, spreading shrub, 1–2 feet high, with shortly-stalked oblanceolate leaves rounded at the tips, green and somewhat rugose above, whitish beneath. Corolla tubular-campanulate, crimson in the specimen shown, but the species includes yellow, white and rose varieties. Flowers about four together, in lax umbels.

To *Rhododendron auritum* as a hardy flowering shrub (votes unanimous), from Lionel de Rothschild, Esq., Exbury. K.W. 6278. An erect, evergreen species. Leaves small, ovate, acute dull green above, paler beneath. The flowers are carried in dense clusters and are tubular-campanulate. The colour is sulphur-yellow.

To *Rhododendron mollicomum* as a hardy flowering shrub (votes unanimous), from Lady Aberconway and the Hon. H. D. McLaren, Bodnant. A small shrub of the Scabrifolium Series. Leaves narrow-lanceolate, downy above, scaly beneath. The flowers are small and are arranged somewhat as in *R. racemosum.* In the specimen shown they were of a bright rose colour, but are described in ' The Species of Rhododendron ' (1930) as crimson.

Other Exhibits.

Lt.-Col. S. R. Clarke, Haywards Heath : *R. floccigerum.*

Lady Aberconway and the Hon. H. D. McLaren, Bodnant : *R. fulvum, R. flavidum* var. *album,* R. ' Asthenia.'

L. de Rothschild, Esq., Exbury : *R. irroratum.*

April 21, 1931, E. H. WILDING, Esq., in the Chair, and six other members present.

Exhibit.

F. C. Stern, Esq., Goring-by-Sea : *Rhododendron sp.* K.W.

April 28, 1931, G. W. E. LODER, Esq., F.L.S., in the Chair, and fifteen other members present.

Awards Recommended :—

Award of Merit.

To *Rhododendron* ' Purple Splendour ' as a hardy flowering shrub (votes 10 for, 1 against), from F. Gomer Waterer's Knaphill Nursery, Ltd., Woking. A hardy hybrid, free flowering and of attractive colouring. Flowers bright purple, blotched with darker colour at the base of the corolla.

To *Rhododendron* ' Mrs. Lionel de Rothschild ' as a hardy flowering shrub (votes 7 for, 1 against), from F. Gomer Waterer's Knaphill Nursery, Ltd., Woking. This is a free-flowering hybrid of great charm. The closely-set trusses are composed of bright pink flowers which become paler at maturity.

To *Rhododendron* ' Astarte ' as a hardy flowering shrub (votes 8 for), from Lady Aberconway and the Hon. H. D. McLaren, Bodnant. A hybrid of *R. dichroanthum* × *R.* ' Penjerrick.' A very distinct variety forming a small, evergreen bush. Leaves oval, two to three inches long. Flowers more or less pendulous, bright salmon-pink, deeper at the margins, arranged in loose trusses.

To *Rhododendron* ' Beryl ' as a hardy flowering shrub (votes 8 for, 2 against), from Admiral A. W. Heneage-Vivian, Swansea. A single truss of this variety

was shown, and therefore no indication of the habit was given. The compact truss is very large, and is surrounded by a number of rugose leaves. The flower-colour is a dull purple.

To *Rhododendron* ' Amethyst ' as a hardy flowering shrub (votes 10 for), from Admiral A. W. Heneage-Vivian, Swansea. Leaves very large, rugose above, brown-tomentose beneath. The bright, rosy-purple flowers are carried in a large, close truss.

To *Rhododendron quinquefolium* as a hardy flowering shrub (votes 10 for), from the Dowager Countess Cawdor, Haslemere. This Japanese Azalea, of the Schlippenbachii sub-series, forms a deciduous shrub or small tree. The flowers are white spotted with pale green at the base of the corolla, and are borne in three-flowered clusters. The leaves are produced at flowering-time, four or five together in terminal bunches.

Other Exhibits.

Lady Aberconway and the Hon. H. D. McLaren, Bodnant: *R. Valentinianum*, *R.* ' Cheronia,' *R.* ' Flavia.'

C. Ingram, Esq., Benenden: *R. penninervum.*

H. Armytage Moore, Esq., Co. Down: *R. pseudochrysanthum*, *R. caloxanthum.*

Messrs. C. Smith & Son, Guernsey: *R.* ' Edith Carey,' *R.* ' Charles Smith,' *R.* ' Compton Mackenzie.'

The Rt. Hon. Lord Swaythling, Southampton: *R.* ' Lady Alice Fitzwilliam.'

Admiral A. W. Heneage-Vivian, Swansea: *R.* ' Clyne Cream,' *R.* ' Ann,' *R.* ' Singleton Blue,' *R.* ' Mary,' *R.* ' Clyne Blue.'

Messrs. Waterer, Sons & Crisp, Bagshot: *R.* ' Niobe.'

E. H. Wilding, Esq., Slough: *R. telopeum.*

May 5, 1931, G. W. E. LODER, Esq., F.L.S., in the Chair, and seven other members present.

Awards Recommended:—

Award of Merit.

To *Rhododendron* ' Madonna ' as a hardy flowering shrub (votes 7 for), from Lt.-Col. L. C. R. Messel, O.B.E., Handcross. A very beautiful white-flowered hybrid raised from the cross *R. decorum* ' Mrs. Messel ' × *R. Griffithianum.* The flowers are large and widely expanded, the stems and young leaves tinged with purple.

To *Rhododendron* ' Lady Montagu ' as a hardy flowering shrub (votes 6 for, 1 against), from Lionel de Rothschild, Esq., Exbury. A very large-flowered variety. The flowers are pink, darker on the exterior, and are arranged in a large, erect truss. Parentage unknown, but probably *R. Griffithianum* × *Thomsonii.* Raised by the sender.

To *Rhododendron* ' Gina ' as a hardy flowering shrub (votes 6 for), from Lionel de Rothschild, Esq., Exbury. Flowers large, rich ruby-red in colour. Truss erect, well-formed. Raised by T. Lowinsky, Esq., of Tittenhurst.

Other Exhibit.

G. W. W. Blathwayt, Esq., West Porlock: *R.* ' Tomassina.'

May 19, 1931, E. H. WILDING, Esq., in the Chair, and nine other members present.

Awards Recommended:—

First-class Certificate.

To *Rhododendron* ' Lady Chamberlain ' as a hardy flowering shrub (votes unanimous), from Lionel de Rothschild, Esq., Exbury. A very beautiful hybrid raised by crossing *R. Maddenii* and *R cinnabarinum* and therefore requiring a warm, sheltered situation. The small leaves are ovate-lanceolate and dark green. The narrow-campanulate flowers are carried in loose, semi-pendulous trusses. Corolla orange-red, suffused externally with rose.

Award of Merit.

To *Rhododendron* ' Leonardslee Sunset ' as a hardy flowering shrub (votes 6 for, 1 against), from Lady Loder, Horsham. Flowers arranged in a full, erect cluster. Corolla widely funnel-shaped, white, flushed with pale pink.

To *Rhododendron Wardii* as a hardy flowering shrub (votes 7 for), from Lionel de Rothschild, Esq., Exbury. A very superior form of what is, perhaps, the best yellow-flowered species of the Souliei sub-series. The leaves are small, oval, and of solid texture. The bright yellow, green-flushed flowers are borne in lax, 8–10-flowered umbels. K.W. 4170.

To *Rhododendron litiense* as a hardy flowering shrub (votes 6 for), from Lionel de Rothschild, Esq., Exbury. This belongs to the same group as the preceding, and like that species comes from high altitudes in Yunnan. Although similar in colouring, it is smaller in all its parts than *R. Wardii.* The two

yellow-flowered, Yunnanese species of the sub-series are *R. astrocalyx* and *R. croceum*.

To *Rhododendron* 'Leonardslee Pink Bride' as a hardy flowering shrub (votes 8 for), from Lady Loder, Horsham. Flowers pale blush-pink, in neat, compact trusses. An attractive variety.

To *Azalea* 'Harold Whitelegg' as a hardy flowering shrub (votes 6 for), from Messrs. L. J. Endtz, Boskoop. A deciduous, Japanese variety. Flowers pink, spotted on the upper side of the corolla with carmine. Raised by the senders, out of seedlings of the cross *Azalea malvatica* × *A. Kaempferi*.

To *Rhododendron* 'Mrs. Walter Burns' as a hardy flowering shrub (votes 6 for), from Lionel de Rothschild, Esq., Exbury. A useful, pink-flowered hybrid of great charm. Raised by T. Lowinsky, Esq., of Tittenhurst.

To *Rhododendron* 'Dolly' as a hardy flowering shrub (votes 6 for), from Lionel de Rothschild, Esq., Exbury. A variety of distinction. The truss is somewhat drooping, and carries several rich pink flowers flushed externally with cherry-red. Raised by the sender.

To *Rhododendron* 'Rosy Morn' as a hardy flowering shrub (votes 7 for), from Lionel de Rothschild, Esq., Exbury. A pretty pink variety. The corolla is lightly spotted with darker colour.

To *Rhododendron* 'Yvonne' var. 'Opaline' as a hardy flowering shrub (votes 6 for), from Lionel de Rothschild, Esq., Exbury. Pink flowers with buds of a darker shade, arranged in loose trusses.

To *Rhododendron* 'Thomasine' as a hardy flowering shrub (votes 7 for), from Lt.-Col. Stephenson R. Clarke, C.B., Haywards Heath. A very attractive hybrid. The pale pink flowers are spotted with red, and are borne on rosy stalks in a compact truss.

To *Azalea* 'Fedora' as a hardy flowering shrub (votes 7 for), from Messrs. C. B. van Nes & Sons, Boskoop. A Japanese Azalea very closely resembling the variety 'Harold Whitelegg,' described above. Raised by Messrs. Koster & Co., of Hollandia Nursery, Boskoop. *Azalea malvatica* × *A. Kaempferi*.

Other Exhibits.

Lt.-Col. S. R. Clarke, C.B., Haywards Heath: *R.* 'Royal Marine.'
Messrs. Endtz, Boskoop: *Azalea* 'Prof. A. Nansen,' *A.* 'Red Dragon.'
Dame Alice Godman, Horsham: *R. Wardii*.
Lady Loder, Horsham: *R.* 'Leonardslee Gem,' *R.* 'Leonardslee Red Glow.'
E. J. Magor, Esq., St. Tudy: *R.* 'Königdis,' *R.* 'Butken,' *R.* 'Decauck.'
Mrs. Philip Martineau, Ascot: *R.* 'Chinatown,' *R.* 'Crean.'
Lt.-Col. L. C. R. Messel, Handcross: *R. saluenense*, *R.* 'Mrs. J. Comber.'
Messrs. van Nes & Sons, Boskoop: *Azalea* 'Anny.'
Lionel de Rothschild, Esq., Exbury: *R. croceum*, *R.* 'Margaret,' *R.* 'Kathleen.'
Mrs. Lindsay Smith, Handcross: *R.* 'Ashfold Pink,' *R.* 'The Fawn,' *R.* 'Beauty of Ashfold.'
The Rt. Hon. Lord Swaythling, Southampton: *R. pruniflorum*.
Admiral A. W. Heneage-Vivian, Swansea: *R. Kingianum*, *R. Griffithianum*.

June 2, 1931, E. H. WILDING, Esq., in the Chair, and six other members present.

Exhibits.

C. E. Heath, Esq., O.B.E., Holmwood: *Rhododendron* 'Mrs. Cuthbert Heath,' *R.* 'Leopold Heath.'
Mrs. Philip Martineau, Ascot: *Azalea* 'Anthony,' *A.* 'Brian.'
Sir John F. Ramsden, Bt., Gerrard's Cross: *R.* 'Fire Opal.' *R.* 'Lemon Dwarf,' *R.* sp. W.K. 6285.

June 16, 1931, Mr. E. H. WILDING in the Chair, and six other members present.

Awards Recommended:—

Award of Merit.

To *Rhododendron* 'Edith' as a hardy flowering shrub (votes unanimous), from Dame Alice Godman, D.B.E., Horsham. A pretty *R. discolor* hybrid. Truss large, erect. Flowers frilled, widely expanded, rich pink with carmine spots.

Other Exhibits.

Mr. G. Reuthe, Keston: *R. cinnabarinum* var. *blandfordianum*, *R. Keysii*.

June 23, 1931, Mr. E. H. WILDING in the Chair, and six other members present.

Exhibit.

Lionel de Rothschild, Esq., Exbury: *Rhododendron* 'Ladybird.'

JOINT IRIS COMMITTEE.

June 2, 1931, Sir WILLIAM LAWRENCE, Bt., V.M.H., in the Chair, and six other members present.

Awards Recommended :—

Award of Merit.

To Iris ' Gudrun ' for exhibition (votes unanimous), from Mrs. Dykes, Woking. A fine white variety having very large falls of good texture veined with gold, and fine bold standards. The beard is deep orange. Height 3 feet.

To Iris ' Saturnia ' for exhibition (votes unanimous), from Mrs. Dykes, Woking. A dark bearded variety of Regelia parentage with bronzy-buff standards and falls, the latter being veined with brown and suffused with light reddish-purple.

To *Iris setosa* for exhibition (votes unanimous), from Messrs. Wallace, Tunbridge Wells. A species of the Apogon section found in Northern Asia, Japan, Kamchatka, Alaska, Labrador, and the South coast of N. America down as far as Maine. The falls are blue-purple sometimes tinged red, with inconspicuous darker veins. The standards are of the same colour, broad at the base narrowing to a fine point. Height from 1 foot to slightly over 2 feet.

To *Iris tingitana Fontanesii latifolia* for cutting (votes unanimous), from Major Albert Pam, Broxbourne. A bulbous Iris of the Xiphium section from Morocco. The falls are light blue with darker purplish veins. A patch of yellow surrounds the end of the raised, almost orange central ridge. The standards are darker than the falls and have wavy edges.

Selected for trial at Wisley.

Iris ' Aline,' from Major F. C. Stern, Goring-by-Sea.
Iris ' Carmelo,' from Orpington Nurseries, Orpington.
Iris ' Gudrun,' from Mrs. Dykes, Woking.
Iris ' Hochelago,' from Orpington Nurseries, Orpington.
Iris ' Marjorie,' from Major F. C. Stern, Goring-by-Sea.
Iris ' Saturnia,' from Mrs. Dykes, Woking.
Iris ' Improved Souvenir de Madame Gaudichau,' from Orpington Nurseries, Orpington.
Iris ' Lady Hudson,' from Orpington Nurseries, Orpington.

Other Exhibits.

Mr. A. Hansen, New Barnet : Iris ' Doreen.'
Major F. C. Stern, Goring-by-Sea : *Iris Barnumae*, **A.M.** 1902.

June 9, 1931. At the Iris Show. Sir WILLIAM LAWRENCE, Bt., V.M.H., in the Chair, and six other members present.

Selected for trial at Wisley.

Iris plicata, from G. P. Baker, Esq., Sevenoaks
Iris ' Golden Hind,' from H. Chadburn, Esq., Saxmundham.
Two seedlings from Mrs. Dykes, Woking.
Iris seedlings, 43/27/5, 43/27/15, 15/26, 18/28/4, 8/26/21 × ' Ophelia,' 8/26/21 × ' Marquisette ' seedlings, 16/29/11, from B. R. Long, Esq., Maidstone.
Iris ' Constance,' from Rev. R. Meyer, Watton-at-Stone.
Iris seedlings E.G., E.A. 1, ' Evelyn Benson,' D.I. 3, E.W. 1, ' Yasmen,' ' Rafi,' ' Pervaneh,' ' Talisman,' from the Orpington Nurseries, Orpington.
Iris seedlings 18/31, 83/31, ' Sunkist,' ' Grey Ghost,' ' Magog,' from Mr. A. Perry, Enfield.
Iris ' Sargon,' from Messrs. Wallace, Tunbridge Wells.

June 16, 1931, Sir WILLIAM LAWRENCE, Bt., V.M.H., in the Chair, and seven other members present.

Awards Recommended :—

Selected for trial at Wisley.

Iris ' Cathay,' from Messrs. Wallace, Tunbridge Wells.
Iris ' Chera,' from Mrs. Dykes, Woking.
Iris seedling Q. 91 (1), from Orpington Nurseries, Orpington.
Iris seedlings 18/29/2 and Iris 18/29/3, from B. R. Long, Esq., Maidstone.

Other Exhibits.

Mrs. Dykes, Woking : *Iris versicolor* hybrids.
Sir William Lawrence, Bt., V.M.H., Dorking : *Iris fulva.*'
G. Yeld, Esq., Gerrard's Cross : Iris ' Vesper.'

ORCHID COMMITTEE.

March 10, 1931, LIONEL DE ROTHSCHILD, Esq., V.M.H., in the Chair, and thirteen other members present.

Awards Recommended :—

Gold Medal.

To Mrs. Walter Burns, North Mymms Park, Hatfield, for Cymbidiums.

To Messrs. H. G. Alexander, Tetbury, for Cymbidiums.

Silver-gilt Banksian Medal.

To Messrs. Charlesworth, Haywards Heath, for a group.

To Messrs. Sanders, St. Albans, for a group.

Silver Banksian Medal.

To Messrs. McBean, Cooksbridge, for Cymbidiums.

To S. G. Brown, Esq., Shepperton, for a group.

Silver Lindley Medal.

To *Cymbidium* × 'Ceres' (votes 12 for), from Mrs. Walter Burns, North Mymms Park, Hatfield, a large specimen with about 200 flowers.

To *Odontonia* × 'Nesta,' Stamperland var. (votes 10 for), from Robert Paterson, Esq., Ardingly.

First-class Certificate.

To *Cypripedium Delenatii* (votes 12 for), from Messrs. Sanders. A comparatively new species from Tonkin. Soft rose with purplish shading and unusually broad petals.

To *Cymbidium* × *regale* ('Auriga' × 'Vesta') (votes 13 for), from Messrs. McBean. Fawn with rose shading, the labellum with reddish markings.

Award of Merit.

To *Cymbidium* × 'Lysander' var. 'Apollo' ('Lady Colman' × 'President Wilson') (votes 9 for), from Messrs. Black & Flory, Slough. Flowers deep green shaded bronze, labellum lighter with a crimson-red apex.

To *Cymbidium* × 'Miranda' var. 'Golden Queen' (*Lowio-grandiflorum* × *Alexanderi*) (votes 12 for), from Messrs. Alexander. Deep amber-yellow, the labellum marked with red.

To *Cymbidium* × 'Thelma' ('Redshank' × *Alexanderi*) (votes 8 for), from Messrs. Alexander. Sepals and petals unusually broad, pure white, the labellum with a few crimson markings.

To *Cymbidium* × 'Jason,' Westonbirt var. ('Miranda' × *Alexanderi*) (votes 8 for, 3 against), from Messrs. Alexander. Flowers large, ivory-white with greenish veins, the labellum with a few red spots on the front lobe.

To *Cymbidium* × 'Louis Sander' (*Alexanderi* × 'Ceres') (votes 11 for), from Messrs. McBean. Fawn with cerise shading, the labellum with a reddish front lobe.

To *Cymbidium* × 'Miranda' var. *exquisitum* (*Alexanderi* × *Lowio-grandiflorum*) (votes 13 for), from Sir W. Cooke, Bt., Wyld Court, Hampstead Norris. Flowers large, greenish, the labellum lighter and with reddish markings.

To *Odontoglossum* × 'Dictune' (*amabile* × 'Her Majesty') (votes 13 for), from Sir W. Cooke, Bt. Flowers large and round, blush-white with reddish-brown blotching.

Cultural Commendation.

To Mr. S. Farnes, Orchid grower to F. J. Hanbury, Esq., Brockhurst, East Grinstead, for *Dendrochilum glumaceum* and for *Laeliocattleya* × 'Gwendolen Leach.'

To Mr. T. King, Orchid grower to S. G. Brown, Esq., Shepperton, for *Dendrobium* × *delicatum*, with 32 flower-spikes.

Preliminary Commendation.

To *Miltonia* × 'Memoria H. T. Pitt' var. 'Brilliant' from Robert Paterson, Esq.

Other Exhibits.

Messrs. Cowan, Southgate : various Orchids.

Messrs. Black & Flory, Slough : Cymbidiums.

F. J. Hanbury, Esq. : *Cattleya* × 'Remy Chollet' var. 'The President.'

Dr. Craven Moore, Duckyls, East Grinstead ; *Cymbidium* × *Alexanderi* var. 'A. T. Cussons.'

March 24, 1931, F. J. HANBURY, Esq., in the Chair, and thirteen other members present.

Awards Recommended :—

Gold Medal.

To Lionel de Rothschild, Esq., Exbury, for Cymbidiums.

To Messrs. Black & Flory, Slough, for a group.

To Messrs. H. G. Alexander, Tetbury, for a group.

Silver-gilt Banksian Medal.

To Messrs. McBean, Cooksbridge, for a group.

To Messrs. Sanders, St. Albans, for a group.

Silver Banksian Medal.

To Messrs. Charlesworth, Haywards Heath, for a group.

To Messrs. Stuart Low, Jarvis Brook, for a group.

To F. J. Hanbury, Esq., Brockhurst, East Grinstead, for a group.

Banksian Medal.

To Mr. John Evans, Colwyn Bay, for a group.

First-class Certificate.

To *Cymbidium* × ' Miranda,' Exbury var. (*Lowio-grandiflorum* × *Alexanderi*) (votes 9 for), from Lionel de Rothschild, Esq. Flowers large and of thick texture, blush-white, the labellum light yellow with a reddish front lobe.

To *Cymbidium* × ' Rosanna ' var. ' Pinkie ' (' Kittiwake ' × *Alexanderi*) (votes 12 for), from Lionel de Rothschild, Esq. Flowers white with rose shading on the back, the labellum bordered with rose-pink, the column deep-rose.

To *Odontoglossum* × ' Alector,' Stonehurst var. (' Amabilicity ' × *crispum*) (votes 8 for, 3 against), from Robert Paterson, Esq., Ardingly. Spike of nine large flowers, the petals very well developed, all the segments marked with reddish-rose.

To *Cymbidium* × ' Macaw ' (parentage unknown) (votes 9 for, 2 against), from Sir William Cooke, Bt., Hampstead Norris. Spike of thirteen flowers, reddish-bronze, labellum light yellow with a deep-crimson blotch.

Award of Merit.

To *Cymbidium* × *Pauwelsii* var. *aureum* (*insigne* × *Lowianum* var. *concolor*) (votes 8 for), from Messrs. McBean, Cooksbridge. Spike of fourteen flowers, bright yellowish-green, the labellum having a lemon-yellow front lobe.

To *Cymbidium* × ' Baldur ' var. ' Magnolia ' (' Castor ' × *Alexanderi*) (votes unanimous), from Lionel de Rothschild, Esq. Flowers unusually large, cream-white, the labellum marked with crimson.

To *Cymbidium* × ' Olympus ' (' Vesta ' × *Alexanderi*) (votes 11 for), from Messrs. Alexander. Flowers round, white, except for some crimson markings on the lip and a rose-coloured column.

To *Cymbidium* × ' Lysander ' var. ' Monarch ' (' President Wilson ' × ' Lady Colman ') (votes 8 for), from Messrs. Black & Flory. Flowers well formed, bright bronze-green, the labellum with a maroon-red apex.

To *Cymbidium* × ' Magali Sander ' var. ' Surprise ' (*Cooperi* × *I'Ansonii*) (votes unanimous), from Messrs. Burstow, Haywards Heath. A distinct Cymbidium, sepals and petals deep crimson-red, the labellum whitish with reddish markings.

To *Sophrolaeliocattleya* × ' Yokohama ' (*S.-l.-c.* × ' Prince Hirohito ' × *C.* × ' Hesperus ') (votes 11 for), from Baron Schröder, Englefield Green. Flowers of medium size, ruby-rose in the sepals and petals, dark crimson in the labellum.

Cultural Commendation.

To Messrs. McBean for *Cymbidium* × ' Gaiety ' (*insigne* × *eburneo-giganteum*).

Other Exhibits.

Robert Paterson, Esq. : *Coelogyne pulchella* and *Brassocattleya* × ' Grand Monarque.'

Messrs. Harry Dixon & Sons, Wandsworth Common : *Cymbidium* × ' Hercules.'

April 8, 1931, LIONEL DE ROTHSCHILD, Esq., in the Chair, and thirteen other members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. Charlesworth, Haywards Heath, for a group.

To Messrs. Stuart Low, Jarvis Brook, for a group.

First-class Certificate.

To *Brassocattleya* × ' Cliftonville ' (*C.* × ' Tityus ' × *B.-c.* × *Cliftonii* var. *magnifica*) (votes 11 for), from Messrs. McBean, Cooksbridge. Flower of large size and excellent formation. Soft purplish-mauve, except for the rich purple labellum.

To *Cymbidium* × 'Joy Sander' var. *magnificum* ('Ceres' × *Pauwelsii*) (votes 10 for), from Messrs. McBean. The spike bore eleven flowers, reddish bronze with darker veining, the labellum whitish with crimson-red on the front lobe.

To *Cymbidium* × *Pauwelsii* var. 'Compte de Hemptinne' (*Lowianum* × *insigne*) (votes 11 for), from Lionel de Rothschild, Esq., Exbury. Probably the finest form of this hybrid. The spike bore twenty flowers, buff-pink with a golden over-tint, the labellum marked with red.

To *Odontoglossum crispum* var. 'Avalanche' (votes 11 for), from Messrs. Charlesworth. An unusually fine home-raised form. Flowers well developed, white, shaded with rose on the sepals, the lip with a few reddish marks.

Award of Merit.

Laeliocattleya × 'Euripides' var. 'Canary' (*L.-c.* × 'Goldcrest' × *L.-c.* × 'Myra') (votes 9 for), from Messrs. McBean. Flower small, but of bright canary-yellow colour.

To *Odontoglossum* × *citrinum*, Stonehurst var. (*eximium* var. *xanthotes* × 'Boadicea' var. *aureum*) (votes 12 for), from Robert Paterson, Esq., Ardingly. The spike bore a dozen flowers, yellowish with blotches of deep yellow.

To *Brassolaeliocattleya* × 'Caligula' var. *majestica* (*L.-c.* × *callistoglossa* × *B.-c.* × *Cliftonii*) (votes 9 for, 4 against), from Sir Jeremiah Colman, Bt., Gatton Park, Surrey. An elegant flower of large size and of pleasing mauve colour, the labellum bright purple.

To *Odontioda* × 'Elina,' Stonehurst var. (*Odontioda* × 'Elsie' × *Odontoglossum* × 'Pharos') (votes 9 for, 3 against), from Robert Paterson, Esq. Flowers of intense crimson colour, the crest golden and wings of the column rose.

Other Exhibits.

Messrs. H. G. Alexander, Tetbury: Cymbidiums.

Baron Schröder, Englefield Green: *Brassolaeliocattleya* × *flavida*.

Messrs. Black & Flory, Slough: *Miltonia* × 'Petunia.'

Messrs. Burstow, Haywards Heath: *Cymbidium* × 'Butterfly' and *C.* × 'Nymph.'

April 21, 1931, Sir JEREMIAH COLMAN, Bt., in the Chair, and fifteen other members present.

Awards Recommended:—

Gold Medal.

To Messrs. Charlesworth, Haywards Heath, for a group.

Silver-gilt Banksian Medal.

To S. G. Brown, Esq., Shepperton, for a group.

Silver Banksian Medal.

To Messrs. Sanders, St. Albans, for a group.

To Messrs. McBean, Cooksbridge, for a group.

Banksian Medal.

To Mr. John Evans, Colwyn Bay, for a group.

First-class Certificate.

To *Cymbidium insigne* var. *Bieri* (votes 12 for), from Sir Jeremiah Colman, Bt., Gatton Park, Surrey. The finest variety of the species. The spike bore eleven blush-rose flowers, the labellum profusely marked with crimson-red lines.

Award of Merit.

To *Laeliocattleya* × 'Nepthys' (*L.-c.* × 'Spalatro' × *C.* × 'Fabia') (votes unanimous), from Messrs. Alexander, Tetbury. Flowers large, purplish-rose.

To *Odontoglossum* × 'Ophelia' ('Melanthus' × 'St. James') (votes 12 for, 4 against), from Messrs. Charlesworth. Spike of nineteen large flowers, purple-rose in colour.

To *Odontonia* × 'Olga' var. 'Duchess of Westminster' (*Odontonia* × 'Thisbe' × *Odontoglossum crispum*) (votes 12 for), from Messrs. Charlesworth. Spike of five large flowers, the labellum well developed.

To *Miltonia* × 'Chelsea,' The Node var. (*Sanderiana* × 'Wm. Pitt') (votes unanimous), from Mrs. Carl Holmes, Codicote, Hitchin. Flowers large and of rich velvety crimson colour.

Preliminary Recognition.

To *Odontoglossum* × 'St. Hilda' (*eximium* × 'crispo-Solon'), from Messrs. McBean. Petals round and blotched with crimson red.

Other Exhibits.

Messrs. Alexander: attractive hybrids.

Sir Jeremiah Colman, Bt., Gatton Park: various *Brassocattleyas*.

F. J. Hanbury, Esq., East Grinstead: *Odontoglossum* × 'Canopus.'

F. Mercer, Esq., Steyning: *Brassocattleya* × 'Cliftonville.'

Brigadier-General Palmer, Bexley: *Odontioda* × 'Diadem.'

E. K. Wilson, Esq., Wimbledon: *Laeliocattleya* × 'Mavis.'

May 5, 1931, Sir JEREMIAH COLMAN, Bt., in the Chair, and fourteen other members present.

Awards Recommended :—

First-class Certificate.

To *Coelogyne Mooreana* var. *magnifica* (votes unanimous), from F. J. Hanbury, Esq., Brockhurst, East Grinstead. The largest form yet seen of this Annam species. The spike bore five flowers. An **A.M.** was given to this plant on August 26, 1930.

Award of Merit.

To *Cypripedium japonicum* (votes unanimous), from Colonel Stephenson R. Clarke, C.B., Borde Hill, Haywards Heath. The erect stem rises to a height of about nine inches and bears a couple of fan-shaped leaves. The apical flower has light greenish sepals and petals and a pouched labellum that is pinkish with red spotting.

Cultural Commendation.

To Mr. T. King, Orchid grower to S. G. Brown, Esq., Shepperton, for a fine plant of *Cyrtopodium punctatum.*

Other Exhibits.

Messrs. Charlesworth, Haywards Heath : Odontoglossums and Miltonias.

Mrs. Carl Holmes, Codicote, Hitchin : *Miltonia* × ' Lycaena ' var. ' Princess Shimadzu.'

Robert Paterson, Esq., Ardingly : *Cymbidium* × ' Petrel ' and *Laeliocattleya* × ' Model.'

May 9, 1931 (Chelsea Show), Sir JEREMIAH COLMAN, Bt., in the Chair, and twenty other members present.

Awards Recommended :—

First-class Certificate.

To *Cymbidium* × ' Ceres ' var. ' F. J. Hanbury ' (*Lowianum* × *insigne*) (votes unanimous), from F. J. Hanbury, Esq., Brockhurst, East Grinstead. Large flowers bronze-red with darker venation ; the labellum cream-coloured with a V-shaped crimson blotch.

To *Miltonia* × ' Memoria H. T. Pitt ' var. ' Velvet ' (' Princess Mary ' × ' Wm. Pitt ') (votes unanimous), from Robert Paterson, Esq., Ardingly. Flowers crimson-red, the labellum with a darker mask at the base.

To *Brassocattleya* × ' Springtide ' var. *magnifica* (*C. Mossiae* × *B.-c.* × ' Mme Chas. Maron ') (votes 13 for). from Messrs. McBean, Cooksbridge, Sussex. A large flower, soft rose-pink, the wide labellum fringed at the margin.

Award of Merit.

To *Sophrolaeliocattleya* × ' Sibola ' (*C.* × ' Tityus ' × *S.-l.-c.* × ' Edna ') (votes 10 for, 4 against), from Messrs. McBean. Delicate blush, the labellum ruby-crimson.

To *Laeliocattleya* × ' Titymoma ' var. ' Chelsea ' (*C.* × ' Tityus ' × *L.-c.* × ' Momus ') (votes unanimous), from Robert Paterson, Esq., Well-formed rosy-mauve flowers, the labellum crimson-purple.

To *Odontoglossum* × ' Mercutans ' var. *perfectum* (' Rosina ' × ' crispo-Solon ') (votes 11 for), from Messrs. Charlesworth, Haywards Heath. Spike of twelve flowers, dark crimson-red in colour.

To *Vuylstekeara* × ' Melba ' var. ' Supreme ' (*V.* × *Brewii* × *O.* × ' Gorizia ') (votes 11 for, 3 against), from Messrs. Charlesworth. Flowers deep crimson-purple, the broad lip somewhat lighter.

To *Odontoglossum* × ' Pandanus,' Exbury var. (' Rosina ' × *regium*) (votes 13 for, 2 against), from Lionel de Rothschild, Esq., Exbury. Spike of fourteen flowers, symmetrically marked with reddish purple.

To *Laeliocattleya* × ' Lady Ebbisham ' (*L.-c.* × ' Myra ' × *C. Mossiae*) (votes unanimous), from Sir Jeremiah Colman, Bt., Gatton Park, Surrey. Flowers of medium size, and of uniform bright yellow colour.

To *Odontoglossum* × ' Toreador ' var. *splendens* (*crispum* × ' Laurentia ') (votes 16 for), from Messrs. Armstrong & Brown, Tunbridge Wells. Large flowers with reddish blotches and spots.

To *Cymbidium* × *Pauwelsii* var. ' The King ' (*insigne* × *Lowianum*) (votes 11 for, 3 against), from Messrs. Armstrong & Brown. Spike of twenty flowers, each five inches in width, cream-white shaded with rose.

To *Laeliocattleya* × ' Britannia ' alba (*C. Warscewiczii* × *L.-c.* × *Canhamiana* (votes 10 for, 4 against), from Messrs. Armstrong & Brown. Flowers large, white, except for the purple lip.

To *Miltonioda* × ' Mrs. Carl Holmes ' (*Miltonia* × ' Wm. Pitt ' × *Odontioda* ' Chanticler ') (votes unanimous), from Messrs. Black & Flory. Flowers of medium size, soft scarlet-rose.

To *Brassocattleya* × ' Mrs. Robert Paterson ' var. ' Chelsea ' (*C.* × ' Clotho ' × *B.-c.* × *Cliftonii*) (votes 13 for), from Messrs. Black & Flory. A well-balanced flower, light blush-rose, the labellum purple.

To *Brassolaeliocattleya* × ' Monarch ' var. *perfecta* (*C.* × ' Tityus ' × *B.-l.-c.* × ' Jupiter ') (votes 10 for, 1 against), from Messrs. Cowan, Southgate. Flower large, soft rose colour, the labellum purplish.

To *Laeliocattleya* × ' Stromboli ' (*L.-c.* × ' Gladiator ' × *C.* × ' Fabia ') (votes 10 for, 2 against), from Messrs. Alexander, Tetbury. Flowers purple-mauve, the labellum ruby-crimson.

To *Laeliocattleya* × ' Cavalese ' var. ' Monarch ' (*L.-c.* × ' Lustre ' × *C.* × ' Fabia ') (votes 10 for, 1 against), from Messrs. Alexander. Flowers rosy-mauve, the labellum ruby-crimson.

To *Cymbidium* × ' Bittern ' var. *exquisitum* (*Gottianum* × *Lowio-grandiflorum*) (votes unanimous), from Messrs. Alexander. Spike of fourteen flowers, light greenish and with a few reddish markings on the lip.

Preliminary Commendation.

To *Miltonia* × ' Princess Margaret ' (' Veda ' × ' Kennie '), (votes 14 for, 3 against), from Messrs. Black & Flory. Uniform old rose.

To *Odontioda* × ' Doris Black ' var. ' The Cardinal ' (*Odontioda* × *Bradshawiae* × *Odontioda* × *magna rubra*) (votes unanimous), from Messrs. Black & Flory. Bright scarlet-red.

Cultural Commendation.

To Mr. S. Farnes, Orchid grower to F. J. Hanbury, Esq., East Grinstead, for *Cymbidium* × *Pauwelsii* var. *magnificum*, with nine many-flowered spikes.

To Messrs. Mansell & Hatcher, Rawdon, Yorks, for *Promenaea* × *Crawshayana* with numerous flowers of yellow colour.

June 2, 1931, Sir JEREMIAH COLMAN, Bt., in the Chair, and thirteen other members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. Charlesworth, Haywards Heath, for a group.

To Messrs. Sanders, St. Albans, for a group.

Banksian Medal.

To Messrs. Stuart Low, Jarvis Brook, for a group.

Award of Merit.

To *Odontoglossum* × ' Eudora ' var. ' The Princess ' (' Dictune ' × ' Serapis ') (votes 8 for, 2 against), from Messrs. Charlesworth. Flowers of thick texture, heavily blotched with chocolate-red.

To *Cattleya* × ' Susan ' var. ' Premier ' (' Suzanne Hye ' × *Cowaniae*) (votes unanimous), from Messrs. McBean, Cooksbridge. The large flower is pure white, save for some orange-yellow colour in the throat area of the labellum.

To *Miltonia* × ' Memoria H. T. Pitt ' var. ' Rose Queen ' (' Princess Mary ' × ' Wm. Pitt ') (votes 10 for, 3 against), from Robert Paterson, Esq., Ardingly. Flowers of rich rose, flushed with red on the sepals and petals, the labellum shaded with ruby-red.

To *Miltonia* × ' Lorna ' (' Lena ' × ' Kennie ') (votes unanimous), from Messrs. Black & Flory. Flowers well above the average size, white, tinged with violet on the base of the petals.

To *Bulbophyllum orthoglossum* (votes unanimous), from Messrs. Sanders. An interesting species from the Malay peninsula. The long sepals are tawny yellow, the petals and dorsal sepal greenish with brown lines, while the mobile labellum is lurid-red.

To *Masdevallia Harryana* var. ' Scarlet King ' (votes unanimous), from Messrs. Armstrong & Brown, Tunbridge Wells. A showy and brightly coloured form represented by several plants with a total of about forty flowers.

Other Exhibits.

Messrs. Alexander, Tetbury : various Orchids.

Messrs. McBean, Cooksbridge : Odontoglossums.

Baron Schröder, Englefield Green : *Miltonia* × ' Lycaena.'

W. H. Jewell, Esq., New Rochelle, U.S.A. : *Cattleya Mossiae* var. ' Mrs. J. T. Butterworth,' a very fine variety.

Robert Paterson, Esq. : *Miltonia* × ' Jules Hye de Crom.'

June 16, 1931, Sir JEREMIAH COLMAN, Bt., in the Chair, and fifteen other members present.

Awards Recommended :—

Gold Medal.

To Messrs. Black & Flory, Slough, for Miltonias.

Silver-gilt Medal.

To Messrs. Charlesworth, Haywards Heath, for a group.

Banksian Medal.

To Messrs. Stuart Low, Jarvis Brook, for a group.

To Messrs. McBean, Cooksbridge, for a group.

Award of Merit.

To *Miltonia* × 'Princess Maud' var. 'Sunrise' (*gattonensis* × *Bleuana*) (votes unanimous), from Robert Paterson, Esq., Ardingly. The sepals are cream-white, the petals and labellum soft rose-pink, the crest being orange-yellow shading to brown.

Cultural Commendation.

To the Swanley Horticultural College, for *Thunia Marshalliana*, seven fine plants with a total of seventeen spikes of bloom.

Other Exhibits.

Brigadier-General Palmer, Bexley: *Odontoglossum* × 'Blendon Gem.'

Messrs. Sanders, St. Albans: *Gongora odoratissima* and *Dendrobium chrysotoxum* var. *latilabrum*.

June 23, 1931, Sir JEREMIAH COLMAN, Bt., in the Chair, and nine other members present.

Awards Recommended:—

First-class Certificate.

To *Vanda* × 'Emma van Deventer' (*tricolor* × *teres*) (votes unanimous), from Mr. W. van Deventer, Wassenaar, Holland. The exhibitor staged four cut-spikes, about 18 inches in height, each with about a dozen large flowers, rose tinted and profusely spotted with lilac-rose.

Award of Merit.

To *Odontoglossum citrosmum*, Gatton Park var. (votes unanimous), from Sir Jeremiah Colman, Bt., Reigate. The pendulous spikes bore seventeen flowers of rose pink colour, the labellum bright rose.

Cultural Commendation.

To Mr. S. Farnes, Orchid grower to F. J. Hanbury, Esq., Brockhurst, East Grinstead, for *Laeliocattleya* × 'Aphrodite,' bearing three spikes, each with four flowers.

Other Exhibits.

Colonel Stephenson R. Clarke, Borde Hill, Haywards Heath: *Cycnoches Loddigesii*, with a spike of four male flowers.

Robert Paterson, Esq., Ardingly, Sussex: *Odontoglossum coronarium*.

Sir Jeremiah Colman, Bt., Reigate: *Cypripedium Stonei* var. *hackbridgense*.

June 30, 1931, Sir JEREMIAH COLMAN, Bt., in the Chair, and twelve other members present.

Awards Recommended:—

Gold Medal.

To Robert Paterson, Esq., Ardingly, Sussex, for a superb group of *Miltonia vexillaria* and its hybrids.

Silver Banksian Medal.

To Messrs. Charlesworth, Haywards Heath, for a group.

Banksian Medal.

To Messrs. Stuart Low, Jarvis Brook, for a group.

Award of Merit.

To *Odontioda* × 'Murillo,' Stonehurst var. (*Odontioda* × 'Chanticler' × *Odontoglossum* × 'Aglaon') (votes 8 for, 3 against), from Robert Paterson, Esq. The spike carried forty deep orange-scarlet flowers, the labellum somewhat lighter.

Cultural Commendation.

To Mr. A. Merry, Orchid grower to Robert Paterson, Esq., for *Miltonia* × 'Lycaena,' Stamperland var., with a spike of six large flowers.

Other Exhibits.

Messrs. Sanders, St. Albans: various Orchids.

July 14, 1931, Sir JEREMIAH COLMAN, Bt., in the Chair, and eleven other members present.

Awards Recommended:—

Banksian Medal.

To Messrs. Charlesworth, Haywards Heath, for a group.

Award of Merit.

To *Brassocattleya* × 'Daphne,' Stonehurst var. (*B.-c.* × 'Dr. G. G. MacDonald' × *C.* × 'Dinah') (votes 9 for, 1 against), from Robert Paterson, Esq. A well-formed flower of purplish mauve colour, the labellum deep, rich purple and with an orange disc near the column.

Preliminary Commendation.

To *Miltonia* × 'Laelia' ('Lucia' × 'Wm. Pitt') (votes 9 for), from Messrs. Black & Flory. A promising seedling displaying rich crimson colour.

Cultural Commendation.

To Mr. T. King, Orchid grower to S. G. Brown, Esq., Shepperton, and to Mr. J. Band, Orchid grower to Frank Mercer, Esq., Steyning, both of whom showed plants of *Brassia verrucosa* with nine flower-spikes.

Other Exhibits.

Messrs. Stuart Low, Jarvis Brook, various Orchids.

Viscountess Byng of Vimy, Thorpe-le-Soken: cut spikes of *Epipactis gigantea*, collected on Vancouver Island.

July 28, 1931, Sir JEREMIAH COLMAN, Bt., in the Chair, and thirteen other members present.

Awards Recommended:—

Silver Banksian Medal.

To Messrs. Charlesworth, Haywards Heath, for a group.

To Messrs. Sanders, St. Albans, for a group.

Award of Merit.

To *Miltonia* × 'Ruby' ('Lucia' × 'Vida') (votes unanimous), from Messrs. Black & Flory, Slough. Flower of rich ruby-crimson colour.

To *Laeliocattleya* × 'Monarch' (*L.-c.* × 'Serbia' × *C. Dowiana aurea*) (votes 12 for), from Messrs. McBean, Cooksbridge. Sepals and petals deep rose-purple, the labellum purple shaded with mauve-purple.

To *Stanhopea devoniensis* (votes 10 for, 1 against), from Messrs. Cowan, Southgate. A Mexican species with buff-yellow sepals and petals that are spotted with red-brown, the labellum ivory-white and with a few purplish markings.

Cultural Commendation.

To Mr. S. Farnes, Orchid grower to F. J. Hanbury, Esq., Brockhurst, East Grinstead for *Cattleya* × 'Ella' with a spike of twenty-one flowers; and for *Odontoglossum Harryanum*, with an aggregate of twenty-one flowers.

Other Exhibits.

Sir Jeremiah Colman, Bt., Reigate: *Odontioda* × 'Mrs. F. E. Dixon.'

Messrs. Black & Flory: various Cattleyas and Miltonias.

Robert Paterson, Esq., Ardingly: *Laeliocattleya* × 'Cavalese.'

NARCISSUS AND TULIP COMMITTEE.

February 10, 1931, Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and ten other members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. R. H. Bath, Wisbech, for Daffodils and Tulips.

To Messrs. A. C. van der Schoot, Hillegom, for Daffodils and Tulips.

February 24, 1931, Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and eleven other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. R. H. Bath, Wisbech, for Daffodils and Tulips.

Silver Banksian Medal.

To Messrs. Warnaar, Sassenheim, for Daffodils and Tulips.

Banksian Medal.

To Messrs. J. R. Pearson, Lowdham, for Daffodils and Tulips.

March 10, 1931, Mr. G. W. LEAK, V.M.H. (later Mr. GEORGE MONRO, C.B.E.), in the Chair, and nine other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Mr. J. L. Richardson, Waterford, for Daffodils.

Silver Banksian Medal.

To Messrs. W. Blom, Hillegom, for Daffodils and Tulips.

To Messrs. L. van Leeuwen, Sassenheim, for Daffodils.

Banksian Medal.

To Messrs. Barr, Covent Garden, for Daffodils.

To Messrs. J. R. Pearson, Lowdham, for Daffodils.

To Messrs. A. C. van der Schoot, Hillegom, for Tulips and Daffodils.

March, 24, 1931, Mr. GEORGE MONRO, C.B.E., in the Chair, and twelve other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Carter's Tested Seeds, Raynes Park, for Daffodils and Tulips.

To Mr. J. L. Richardson, Waterford, for Daffodils.

Silver Banksian Medal.

To Messrs. Barr, Covent Garden, for Daffodils.

To Mr. R. F. Calvert, Coverack, Cornwall, for Daffodils.

To Mr. Guy L. Wilson, Broughshane, co. Antrim, for Daffodils.

Award of Merit.

To *Narcissus* ' Fortune's Crest ' as a variety for exhibition (votes 10 for, 0 against). An *incomparabilis* variety (Division 2a) with broad, smooth, overlapping, pale sulphur-yellow perianth segments and a rich orange cup about half the length of the perianth segments. Raised by the Brodie of Brodie and shown by Mr. R. F. Calvert, Coverack, Cornwall.

To *Narcissus* ' Havelock ' as a variety for cutting (votes 9 for, 0 against). An *incomparabilis* variety (Division 2a) with large flowers well poised on 22-inch stems. The perianth segments are broad, smooth, slightly reflexed, and of a clear yellow. The cup, which is about two-thirds the length of the perianth segments, is of a deeper shade of yellow. This variety received an **A.M.** for exhibition purposes on March 22, 1927. Raised and shown by Mr. P. D. Williams, St. Keverne.

April 8, 1931, Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and thirteen other members present.

Awards Recommended :—

Gold Medal.

To Mr. J. L. Richardson, Waterford, for Daffodils.

Silver-gilt Banksian Medal.

To Messrs. Barr, Covent Garden, for Daffodils.

Silver Banksian Medal.

To Messrs. W. Blom, Hillegom, for Tulips.

To Mr. R. F. Calvert, Coverack, for Daffodils.

Banksian Medal.

To Messrs. Wakeley, 79, Bankside, S.E. 1, for Tulips and Daffodils.

Award of Merit.

To *Narcissus* ' Rewa ' as a variety for exhibition (votes 11 for, 0 against). An *incomparabilis* variety (Division 2b) with well-poised flowers borne on long stems. The creamy white perianth segments are broad, overlapping and fairly smooth, and the cup, which is about half the length of the perianth segments, is orange-yellow and slightly frilled. Raised by the late Dr. N. Y. Lower, and shown by Mr. J. L. Richardson.

The Breaking of Tulips.

Sir Daniel Hall exhibited a plant of *Tulipa ingens* which had broken, and pointed out that although it was commonly thought that breaking was confined to garden varieties of tulips, tulip species were also liable to break. He drew attention to the fact that the plant shown was dwarfed, that the perianth was reduced in size and somewhat laciniated, and that the segments carried markings of a deeper colour than the normal, but did not show patches of white or yellow ground colour as is usual with broken garden tulips. Sir Daniel also showed two garden varieties of tulips which exhibited the first signs of breaking such as may be seen when a plant becomes infected just before coming into bloom.

April 14, 1931 (Daffodil Show), Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and twenty-two other members present.

Awards Recommended :—

Gold Medal.

To Messrs. Barr, Covent Garden.

To Mr. J. L. Richardson, Waterford.

Silver-gilt Banksian Medal.

To Messrs. R. H. Bath, Wisbech.

To Messrs. F. Rijnveld, Hillegom.

Silver Banksian Medal.

To Mr. R. F. Calvert, Coverack.

To Messrs. D. Stewart, Wimborne.

To Messrs. Warnaar, Sassenheim.

To Mr. Guy L. Wilson, Broughshane.

Banksian Medal.

To the Donard Nursery Company, Newcastle, co. Down.

To Mr. H. Prins, Wisbech.

To The Welsh Bulb Fields, St. Asaph.

The whole of the above-mentioned awards were for groups of daffodils.

Award of Merit.

To *Narcissus* ' Carbineer ' as a variety for exhibition (votes 17 for, 0 against). A shapely *incomparabilis* variety (Division 2a) with smooth, clear-yellow perianth segments and an orange cup about half the length of the segments. Raised by Mr. A. M. Wilson and shown by Mr. J. L. Richardson.

To *Narcissus* ' Solid Gold ' as a variety for exhibition and for cutting (votes 14 for, 0 against). A refined, well-proportioned, self-coloured, aureoline-yellow, trumpet variety (Division 1a), of medium size and height, with broad, smooth, overlapping segments and a slightly reflexed margin to the trumpet. Raised and shown by the Donard Nursery Company.

Variety Selected for Trial.

Narcissus ' Solid Gold ' was selected for trial at Wisley as a market variety for cutting from the open.

Other Exhibits.

Hybrids between *N. cyclamineus* and *N. triandrus* were exhibited by Miss A. R. Baring.

The Peter Barr Memorial Cup.

It was unanimously recommended that the Peter Barr Memorial Cup, which is awarded annually to someone who has done good work on behalf of the Daffodil, be awarded to Mr. J. L. Richardson.

April 21, 1931, Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and eleven other members present.

Awards Recommended :—

Gold Medal.

To Messrs. Barr, Covent Garden, for Daffodils.

To Mr. F. A. Secrett, Twickenham, for Daffodils.

Silver-gilt Banksian Medal.

To Messrs. R. H. Bath, Wisbech, for Daffodils.

To Mr. R. F. Calvert, Coverack, for Daffodils.

To Messrs. J. R. Pearson, Lowdham, for Daffodils.

Silver Banksian Medal.

To Messrs. Dobbie, Edinburgh, for Daffodils.

Banksian Medal.

To Mr. H. G. Longford, Abingdon, for Daffodils.

First-class Certificate.

To *Narcissus* ' Huon ' as a variety for cutting (votes 8 for, 0 against). This excellent *poeticus* variety (Division 9) received an **A.M.** for cutting on May 7, 1929 (JOURNAL R.H.S., vol. **55**, p. lxx.) and an **A.M.** for market on May 6, 1930 (JOURNAL R.H.S., vol. **56**, p. liii). Raised by Rev. G. H. Engleheart and shown by Mr. F. A. Secrett.

Award of Merit.

To *Narcissus* ' Pera ' as a variety for exhibition (votes 7 for, 1 against). This bicolor *Barrii* variety (Division 3b) has white, slightly reflexed, perianth segments, and a disc-like corona margined with a broad red band which passes to yellow at the centre. Raised by the Brodie of Brodie and shown by Mr. R. F. Calvert.

To *Narcissus* ' Garibaldi ' as a variety for cutting (votes 11 for, 0 against). A richly-coloured and attractive *incomparabilis* variety (Division 2a) with flat, rather pointed, clear-yellow perianth segments, and a bright orange, narrow cup about half the length of the segments. Raised by Mr. A. M. Wilson and shown by Messrs. J. R. Pearson.

To *Narcissus* ' Aviemore ' as a variety for exhibition (votes 10 for, 0 against). An *incomparabilis* variety (Division 2a) with long and exceptionally stout stems. The pale primrose-yellow perianth segments are broad and overlapping, the inner ones having a slight tendency to roll inwards, and the rather spreading fluted cup, which is slightly less than half the length of the segments, is orange passing to golden yellow at the base. Raised by the Brodie of Brodie and shown by Mr. J. L. Richardson.

To *Narcissus* ' Colorado ' as a variety for exhibition (votes 10 for, 0 against). A bicolor *Barrii* variety (Division 3b) with flowers of medium size borne on rather short (15-inch) stems. The pure white perianth segments are smooth and flat, and the colour of the small, much-pleated, disc-like corona shades from red at the margin through orange and yellow to green at the centre. Raised by Mrs. R. O. Backhouse and shown by Mr. J. L. Richardson.

Varieties Selected for Trial.

The following Daffodils were selected for trial at Wisley as market varieties for cutting from the open :

Narcissus ' Garibaldi,' shown by Messrs. J. R. Pearson.

Narcissus ' Winnie Weedon,' shown by Mr. F. A. Secrett.

Other Exhibits.

Sir Daniel Hall exhibited a flower of Tulip ' Keizerskroon ' which had broken.

May 5, 1931, Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and thirteen other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Mr. F. A. Secrett, Twickenham, for Daffodils.

To Messrs. A. C. van der Schoot, Hillegom, for Daffodils and Tulips.

Silver Banksian Medal.

To Messrs. Barr, Covent Garden, for Daffodils and Tulips.

Varieties Selected for Trial.

Narcissus ' Yellow Jacket,' shown by Mr. C. A. Jardine, Chiswick, was selected for trial at Wisley as a variety for garden decoration.

The following Daffodils were selected for trial as market varieties for cutting from the open and as varieties for garden decoration :—

' Gayton,' ' Sonata ' and ' White Guard,' shown by Messrs. R. H. Bath, Wisbech.

' Sparkling Eye ' shown by Messrs. A. C. van der Schoot.

Other Exhibits.

Sir Daniel Hall showed some hybrids between *Tulipa Batalinii* and *T. Maximowiczii* which had broken and developed splashes of yellow and streaks of red in place of the normal apricot colour.

May 19, 1931 (Chelsea Show), Mr. P. D. WILLIAMS, V.M.H., in the Chair, and eleven other members present.

Awards Recommended :—

Award of Merit.

To *Narcissus* ' Dactyl ' as a variety for exhibition (votes 9 for, 1 against) and as a variety for cutting (votes 8 for, 0 against). A well-formed *poeticus* variety (Division 9) with a medium-sized, yellow, green-centred, scarlet-rimmed corona. Raised by Rev. G. H. Engleheart and shown by Mr. A. M. Wilson, Presteign.

To *Narcissus* 'Coral Gem' as a variety for cutting (votes unanimous). A *poeticus* variety (Division 9) with broad overlapping perianth segments and an orange red corona. Raised by Rev. G. H. Engleheart and shown by Mr. F. A. Secrett.

To Tulip 'Grey Dawn' (votes 9 for, 0 against). A shapely English Tulip with grey perianth segments flushed with rose at the midribs. Raised and shown by Sir Daniel Hall, Merton.

To Tulip 'Mr. van Zijl' (votes 8 for, 0 against). A white-based Darwin Tulip, rose-red, passing to blush-pink at the margins of the segments. Raised by Messrs. C. G. van Tubergen and shown by Messrs A. C. van der Schoot, Hillegom.

To Tulip 'Wall street' (votes unanimous). A vigorous, lemon-yellow, Cottage Tulip. Raised by Mr. Nicholaas Dames, and shown by Messrs. W. Blom, Hillegom, and by Messrs. A. C. van der Schoot.

June 2, 1931, Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and ten other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Dobbie, Edinburgh, for Tulips.

The Awards to Narcissi recommended after trial at Wisley were approved (see Report).

BOOKS AND PAMPHLETS PRESENTED, PURCHASED OR REVIEWED DURING THE HALF-YEAR ENDING JUNE 30, 1931, AND DEPOSITED IN THE LIBRARY.

1 = Purchased.
2 = Sent for Review.
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7 , the Secretary of State for India.
8 , the Director, Royal Botanic Gardens, Kew.
9 , Mr. J. J. Ochse.
10 , Mr. E. A. Bunyard.
11 , Mr. Donald H. Gunner.
, Mr. W. Bunn.
13 , the Keeper of the Manchester Museum.

Abbreviations.—Col. pls. = coloured plates; illus. = illustrated; rev. = revised; pls. = plates; ed. = editor, edited or edition; n.d. = no date; n.p. = no place (of publication given).

When books are published in London, the place of publication is not named in the entry.

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Alston, A. H. G. Supplement to the flora of Ceylon. *See* TRIMEN, H. Flora of Ceylon.

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Ashby, Eric. [*Transl.*]. *See* LUNDEGÅRDH, H.

Bailey, Charles. *See* WEISS, F. E. Three Manchester botanists.

Bailey, Ethel Zoe. *See* BAILEY, L. H. Hortus.

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Bakhuizen van den Brink, R. C. *See* OCHSE, J. J. Fruits and fruitculture in the Dutch East Indies.

—— *See* OCHSE, J. J. Vegetables of the Dutch East Indies.

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Bicknell, C. Flowering plants and ferns of the Riviera, and neighbouring mountains. Col. pls. 4to. 1885. (3)

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Blanck, E. [*Ed.*]. Handbuch der Bodenlehre. Vol. 7. 8vo. Berlin, 1931. (1)

Bose, *Sir* Jagadis Chunder. Life Movements in plants (Trans. Bose Res. Inst. Calcutta, vi). Illus. 8vo. 1931. (2)

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Byl, P. A. van der. *See* ADAMSON, R. S. Botanical features of the S.W. Cape Province.

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Compton, R. H. *See* ADAMSON, R. S. Botanical features of the S.W. Cape Province.

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Dykes, W. R. DYKES on Irises. *See* IRIS SOCIETY.

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Forsyth, William. A treatise on the culture and management of fruit-trees. Illus. 4to. 1802. (4)

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Levyns, *Mrs.* M. R. *See* ADAMSON, R. S. Botanical features of the S.W. Cape Province.

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Melvill, James Cosmo. *See* WEISS, F. E. Three Manchester botanists.

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EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

FOREMARKE CHALLENGE CUP COMPETITION.

AUGUST 25, 1931.

The Foremarke Challenge Cup, for twenty spikes of named Gladioli in not less than ten varieties, was awarded to Mr. W. E. Phillips, 52 Clarence Road, Wood Green, N.

AUTUMN SHOW—OPEN-AIR PLANTS AND ROSES.

SEPTEMBER 23–24, 1931.

AWARDS.

The Coronation Cup, for the best exhibit in the show other than Roses.

To Messrs. Dobbie, Edinburgh, for Dahlias.

The Wigan Cup, for the best exhibit of Roses.

To Messrs. S. McGredy, Portadown, Ireland.

Gold Medal.

Messrs. Blackmore & Langdon, Bath, for Begonias.
Messrs. Alex. Dickson, Newtownards, for Roses.
Messrs. Dobbie, Edinburgh, for Dahlias.
Messrs. S. McGredy, Portadown, Ireland, for Roses.

Silver Cup.

Messrs. R. H. Bath, Wisbech, for Gladioli.
Messrs. Carter Page, London Wall, for Dahlias.
Messrs. Dickson & Robinson, Manchester, for Dahlias.
Mr. T. Robinson, Nottingham, for Roses.

Silver-gilt Flora Medal.

Mr. T. M. Endean, Laindon, for Cacti and Succulents.
Mr. C. Gregory, Chilwell, for Roses.
Messrs. H. J. Jones, Lewisham, for Dahlias.
Messrs. Keith Luxford, Sawbridgeworth, for Chrysanthemums.
Mr. J. B. Riding, Chingford, for Dahlias.
Messrs. Sutton, Reading, for Begonias from seed.
Messrs. J. Waterer, Sons & Crisp, Twyford, for herbaceous plants.

Silver-gilt Banksian Medal.

Messrs. Barr, Covent Garden, for Montbretias and other herbaceous plants.
Mr. T. Bones, Cheshunt, for Michaelmas Daisies.
Messrs. Chaplin, Waltham Cross, for Roses.

Messrs. Dobbie, Edinburgh, for Gladioli.
Mr. J. W. Forsyth, Putteridge, for Chrysanthemums.
Mr. James Macdonald, Harpenden, for lawn garden.
Mr. Stuart Ogg, Swanley, for Dahlias.
Mr. Amos Perry, Enfield, for mixed group of aquatic and bog plants and Ferns.
Messrs. M. Prichard, Christchurch, for herbaceous plants.
Messrs. D. Prior, Colchester, for Roses.
Messrs. T. Smith, Stranraer, for Roses.
Messrs. J. Waterer, Sons & Crisp, Twyford, for Roses.

Silver Lindley Medal.

Messrs. Bowell & Skarratt, Cheltenham, for Sempervivums.

Silver Flora Medal.

Messrs. Blackmore & Langdon, Bath, for mixed group of Phloxes, Delphiniums and other herbaceous plants.
Messrs. Ben. R. Cant, Colchester, for Roses.
Messrs. Dowty's Rosery, Wokingham, for Roses.
Mr. E. J. Hicks, Hurst, Twyford, for Roses.
Messrs. I. House, Bristol, for mixed group of Scabious, Kniphofias and other herbaceous plants.
Messrs. Jarman, Chard, for Dahlias.
Messrs. B. Ladhams, Southampton, for herbaceous plants and Water-lilies.
Messrs. Laxton Brothers, Bedford, for Roses.
Messrs. D. Stewart, Wimborne, for mixed group of herbaceous and bulbous plants.
Messrs. J. Stredwick, St. Leonards, for Dahlias.
Messrs. W. Treseder, Cardiff, for Dahlias.
Mr. W. Wells, junior, Merstham, for Michaelmas Daisies and other herbaceous plants.
Mr. J. T. West, Brentwood, for Dahlias.
Messrs. Wm. Wood, Taplow, for herbaceous plants.
Mr. W. Yandell, Maidenhead, for mixed group of Chrysanthemums and Violas.

Silver Banksian Medal.

Messrs. Allwood, Haywards Heath, for Pinks and Border Carnations.
Messrs. Bakers, Codsall, for herbaceous plants.
Mr. E. Ballard, Malvern, for mixed group of Michaelmas Daisies, Solidagos and Rudbeckias.
Messrs. Frank Cant, Colchester, for Roses.
Messrs. J. Cheal, Crawley, for herbaceous plants.
Messrs. Daniels, Norwich, for Gladioli, Montbretias, Larkspurs, etc.
Messrs. Clarence Elliott, Stevenage, for rock-garden plants.
Messrs. E. F. Fairbairn, Carlisle, for mixed group of Phloxes and Dahlias.
Messrs. J. Forbes, Hawick, for mixed group of Phloxes and Pentstemons.
The Gayborder Nurseries, Melbourne, Derbyshire, for herbaceous plants.
Messrs. Gibson & Amos, Cranleigh, for a mixed group of Gladioli, Kniphofias and Dahlias.
Messrs. Harkness, Bedale, for Lupins.
Mr. H. Hemsley, Crawley, for mixed group of Dahlias and Sidalceas.
Mr. Gavin Jones, Letchworth, for herbaceous plants.
Messrs. H. J. Jones, Lewisham, for mixed group of Chrysanthemums and herbaceous plants.
Messrs. W. Keep, Enfield, for mixed group of Violas and herbaceous plants.
Messrs. H. Langridge, Westerham, for mixed group of Dahlias and Gladioli.
Messrs. H. C. Lawrence, Chatham, for Chrysanthemums.
Mr. A. Miles, Bickley, for herbaceous plants.
Messrs. Neale, Solihull, for Dahlias.
The Orpington Nurseries, Orpington, for Gladioli.
Messrs. M. Prichard, Christchurch, for rock-garden plants.
Messrs. E. J. Redgrove, Borough Green, for mixed group of herbaceous plants, Dahlias and Gladioli.
Messrs. A. Reeves, Old Catton, Norwich, for Roses.
Messrs. R. Wallace, Tunbridge Wells, for mixed group of Lilies and other bulbous and herbaceous plants.

Flora Medal.

Messrs. Bentall, Romford, for Roses.
Messrs. Casburn & Bedford, Trumpington, for rock-garden plants.
Messrs. Hocker Edge Gardens, Cranbrook, for rock-garden plants.
Messrs. W. E. T. Ingwersen, East Grinstead, for rock-garden plants.
Messrs. Maxwell & Beale, Dorset, for rock-garden plants.
Mr. G. Prince, Longworth, for Roses.
Messrs. G. Reuthe, Keston, for mixed group of herbaceous, bulbous and rock-garden plants.
Mr. G. E. Welch, Huntingdon, for rock-garden plants.
Messrs. A. Warner, Colchester, for Roses.
Messrs. H. Morse, Norwich, for Roses.

Banksian Medal.

Major Brammall, Bickley, for rock-garden plants.
Mr. P. Gardner, Addingham, for rock-garden plants.
Messrs. G. Gibson, Leeming Bar, for mixed group of herbaceous plants, rock-garden plants and Ferns.
Messrs. Maytham Gardens, Rolvenden, for Verbenas.
Messrs. W. H. Rogers, Southampton, for rock-garden plants.
Mr. W. Wells, junior, Merstham, for Gentians and other rock-garden plants.
Messrs. Wheatcroft Bros., Gedling, for Roses.

SEWELL MEDAL COMPETITION.

The Sewell Medal, offered for the best six pots or pans of plants suitable for the rock-garden or alpine house shown by an amateur, was awarded to Sir William Lawrence, Bt., V.M.H., Burford, Dorking.

A lecture was given by Mr. D. Cuthbertson on " Impressions of Seed-Growing in California " (see p. 15).
Chairman, Mr. L. G. SUTTON, C.B.E., F.L.S.

AUTUMN SHOW—TREES AND SHRUBS.

SEPTEMBER 30–OCTOBER 1, 1931.

AWARDS.

Silver Cup.

Messrs. Hillier, Winchester, for trees and shrubs.
Messrs. R. Wallace, Tunbridge Wells, for trees and shrubs.
Messrs. J. Waterer, Sons & Crisp, Twyford, for trees and shrubs.

Silver-gilt Flora Medal.

The Donard Nursery Co., Newcastle, co. Down, for trees and shrubs.
Mr. J. B. Riding, Chingford, for Dahlias.
Messrs. J. Waterer, Sons & Crisp, Twyford, for Dahlias.

Silver-gilt Hogg Medal.

Mr. J. C. Allgrove, Slough, for fruit trees in pots and gathered fruit.
Messrs. G. Bunyard, Maidstone, for collection of fruit.
Messrs. Laxton, Bedford, for collection of fruit.

Silver-gilt Banksian Medal.

Mr. T. Bones, Cheshunt, for Michaelmas Daisies.
Messrs. J. Cheal, Crawley, for trees and shrubs.
Messrs. B. Ladhams, Southampton, for trees and shrubs.
Mr. W. J. Marchant, Stapehill, Wimborne, for trees and shrubs.
Mr. R. C. Notcutt, Woodbridge, for shrubs.
Messrs. D. Prior, Colchester, for Roses.
Messrs. G. Reuthe, Keston, for shrubs.
Mr. T. Robinson, Nottingham, for Roses.

Silver Flora Medal.

Mr. E. Ballard, Malvern, for Michaelmas Daisies.
Messrs. Carter Page, London Wall, for Dahlias.
Messrs. Charlesworth, Haywards Heath, for Orchids.
Messrs. Cowan, Southgate, for Orchids.
Messrs. Alex. Dickson, Newtownards, for Roses.
Messrs. Fletcher, for trees and shrubs.
Messrs. Maxwell & Beale, Broadstone, for Heathers.
Messrs. Sanders, St. Albans, for Orchids.
Messrs. D. Stewart, Wimborne, for trees, shrubs and conifers.
Messrs. Wm. Treseder, Cardiff, for Dahlias.
Mr. G. G. Whitelegg, Chislehurst, for trees, shrubs and dwarf conifers.
Messrs. Wm. Wood, Taplow, for trees and shrubs.

Silver Hogg Medal.

Messrs. T. Rivers, Sawbridgeworth, for fruit trees in pots and gathered fruit.

Silver Banksian Medal.

Messrs. Allwood, Haywards Heath, for Carnations and Pinks.
Messrs. Ben. R. Cant, Colchester, for Roses.
Messrs. Frank Cant, Colchester, for Roses.
Messrs. Chaplin, Waltham Cross, for Roses.
Messrs. W. Cutbush, Barnet, for shrubs and conifers.
Messrs. Dowty's Rosery, Wokingham, for Roses.
Messrs. I. House, Bristol, for mixed group of Scabious, Kniphofias and Gaillardias.
Messrs. Jarman, Chard, for Dahlias.
Mr. Stuart Ogg, Swanley, for Dahlias.
Mr. T. Smith, Newry, co. Down, for trees and shrubs.
Mr. F. Gomer Waterer's Knaphill Nursery, Woking, for trees and shrubs.
Mr. W. Wells, junior, Merstham, for Michaelmas Daisies and other herbaceous plants.
Mr. J. T. West, Brentwood, for Dahlias.

Flora Medal.

Messrs. Bakers, Codsall, for trees and shrubs.
Messrs. Barr, Covent Garden, for Michaelmas Daisies, Crocuses, Colchicums and rock-garden plants.
The Gayborder Nurseries, Melbourne, Derbyshire, for Michaelmas Daisies.
Mr. S. J. Goodliffe, Bishops Stortford, for mixed group of Dahlias and other herbaceous plants.
Messrs. Harrods, Knightsbridge, for clipped Box and Bay trees.
Mr. H. Hemsley, Crawley, for trees and shrubs.
Messrs. Hollamby's Nurseries, Groombridge, for ornamental vines and other shrubs.
Messrs. G. Jackman, Woking, for Clematis.
Messrs. H. Langridge, Westerham, for Dahlias.
Messrs. H. C. Lawrence, Chatham, for Chrysanthemums.
Mr. A. Miles, Bickley, for herbaceous plants.
Messrs. Neale, Solihull, for Dahlias.
Messrs. Patricks, Sevenoaks, for trees and shrubs.
Mr. Amos Perry, Enfield, for herbaceous plants and Lilies.
Messrs. L. R. Russell, Ltd., Richmond, for Clematis, vines and other shrubs.
Mr. W. Yandell, Maidenhead, for Chrysanthemums.

Banksian Medal.

Mr. A. I. Adams, Tunbridge Wells, for shrubs and ornamental climbers.
Mr. J. C. Allgrove, Slough, for shrubs.
Messrs. Bentall, Romford, for Roses.
Messrs. G. Bunyard, Maidstone, for hedging plants, screen trees and shrubs.
Messrs. Burkwood & Skipwith, Kingston, for trees and shrubs.
The Central Garden Supplies, Kenton, for Dwarf Japanese trees.
Messrs. Clark, Dover, for trees and shrubs.
Messrs. W. Keep, Enfield, for hardy plants and Violas.
Messrs. W. T. & H. E. Neale, Newhaven, for Gazanias.
Messrs. R. Veitch, Exeter, for trees and shrubs.
Mr. G. E. Welch, Cambridge, for rock-garden plants.

FRUIT AND VEGETABLE SHOW.

OCTOBER 6–7, 1931.

Chief Awards.

FRUIT.

The Gordon-Lennox Cup, for the most meritorious display of fruit staged by an amateur.

To the trustees of the late Duke of Newcastle, Clumber, Worksop (gr. Mr. S. Barker.)

The George Monro Memorial Cup, for the best exhibit of Grapes staged by an amateur.

To Lady Savile, Rufford Abbey, Ollerton, Notts (gr. Mr. J. Doe).

The Affiliated Societies Challenge Cup, for the best exhibit of fruit staged by an Affiliated Society, was awarded to the Pangbourne and District Gardeners' Mutual Improvement Association.

Class 1.—Amateurs. Collection of nine dishes of ripe dessert fruit.
First Prize, Silver Hogg Medal and £9.

To the trustees of the late Duke of Newcastle, Clumber, Worksop (gr. Mr. S. Barker).

Class 2.—Amateurs. Collection of six dishes of ripe dessert fruit.
First Prize, Silver Hogg Medal and £6.

To C. G. A. Nix, Esq., V.M.H., Tilgate, Crawley (gr. Mr. E. Neal).

Class 3.—Amateurs. Collection of eight bunches of Grapes.
First Prize, Silver Hogg Medal and £15.

To Lady Savile, Rufford Abbey, Ollerton, Notts (gr. Mr. J. Doe).

Class 4.—Amateurs. Collection of four bunches of Grapes.
First Prize, Silver Hogg Medal and £6.

To the trustees of the late Duke of Newcastle, Clumber, Worksop (gr. Mr. S. Barker).

Class 19.—Amateurs. Collection of thirty dishes of hardy fruits.
First Prize, Silver Hogg Medal and £15.

To Sir Randolf Baker, Bt., D.S.O., Ranston, Blandford (gr. Mr. A. E. Usher).

Class 20.—Amateurs. Collection of twelve dishes of hardy fruits.
First Prize, Silver Hogg Medal and £6.

To the Duke of Buccleuch, Boughton House, Kettering (gr. Mr. R. Learmonth).

Class 21.—Amateurs. Collection of twenty-four dishes of Apples.
First Prize, Fruiterers' Company's Silver-gilt Medal and £10.

To F. C. Stoop, Esq., West Hall, Byfleet (gr. Mr. G. Carpenter).

Class 22.—Amateurs. Collection of twelve dishes of Apples.
First Prize, Fruiterers' Company's Silver Medal and £5.

To Sir Randolf Baker, Bt., D.S.O., Ranston, Blandford (gr. Mr. A. E. Usher).

Class 25.—Amateurs. Collection of eighteen dishes of dessert Pears.
First Prize, Silver-gilt Hogg Medal and £10.

To Lt.-Col. F. J. B. Wingfield Digby, D.S.O., Sherborne Castle, Dorset (gr. Mr. E. Hill).

Class 131.—Market Growers. Four British standard half-boxes of 'Cox's Orange Pippin' Apple.
First Prize, Silver Hogg Medal and £5.

To Reading University, Reading.

Class 132.—Market Growers. Four British standard half-boxes of any dessert Apple other than 'Cox's Orange Pippin.'
First Prize, Silver Hogg Medal and £5.

To the Hollesley Bay Labour Colony, Suffolk.

Class 133.—Market Growers. Four British standard boxes of 'Bramley's Seedling' Apple.
First Prize, Silver Hogg Medal and £5.

To Messrs. F. & T. Neame, Faversham.

Class 134.—Market Growers. Four British standard boxes of any cooking Apple other than 'Bramley's Seedling.'
First Prize, Silver Hogg Medal and £5.

To Mr. T. B. Douglas, Hatfield Peverel, Essex.

Class 135.—Market Growers. Three one-layer boxes of 'Cox's Orange Pippin' Apple.
First Prize, Hogg Medal and £3.

To Mr. T. B. Douglas, Hatfield Peverel, Essex.

Class 136.—Market Growers. Three one-layer boxes of any dessert Apple other than 'Cox's Orange Pippin.'
First Prize, Hogg Medal and £3.

To Mr. T. B. Douglas, Hatfield Peverel, Essex.

Class 137.—Market Growers. Three one-layer boxes of 'Conference' Pears.
First Prize, Hogg Medal and £3.

To Messrs. F. & T. Neame, Faversham.

Class 138.—Market Growers. Three one-layer boxes of 'Doyenne du Comice' Pears.
First Prize, Hogg Medal and £3.

To Messrs. F. & T. Neame, Faversham.

VEGETABLES.

The R.H.S. Challenge Cup, for the highest aggregate number of points.

To Sir Randolf Baker, Bt., D.S.O., Ranston, Blandford (gr. Mr. A. E. Usher).

The Riddell Cup, for a table of vegetables.

To Sir Randolf Baker, Bt., D.S.O., Ranston, Blandford (gr. Mr. A. E. Usher).

The Sutton Cup, for a collection of twelve kinds of vegetables.

To Lord Riddell, Walton Heath House, Tadworth (gr. Mr. A. Payne).

Class 203.—Amateurs. Collection of nine kinds of vegetables.
First Prize, Silver-gilt Knightian Medal and £5.

To Earl Beatty, Reigate Priory, Reigate (gr. Mr. A. Barrett).

A lecture was given by Mr. C. G. A. Nix, V.M.H., on "Varieties of Fruit for Gardens" (see p. 1).
Chairman, Mr. E. A. Bunyard, F.L.S.

CONIFER CONFERENCE.

NOVEMBER 11–12, 1931.

AWARDS.

Gold Veitch Memorial Medal.

To the Marquess of Headfort, Kells, co. Meath.
(A money prize of £5 was awarded to the gardener, Mr. J. A. Boyle.)

Gold Medal.

To Messrs. Hillier, Winchester.

Silver-gilt Lindley Medal.

To Gerald W. E. Loder, Esq., Ardingly.

Silver-gilt Flora Medal.

To Lady Aberconway and the Hon. H. D. McLaren, Bodnant, N. Wales.
To the Marquess of Headfort, Kells, co. Meath.
To Messrs. G. Reuthe, Keston.

Silver-gilt Banksian Medal.

To Lt.-Col. Stephenson R. Clarke, Borde Hill, Cuckfield.
To Neville Cooper, Esq., Vernon Holme, Canterbury.
To Lady Loder, Leonardslee, Horsham.
To Lt.-Col. L. C. R. Messel, Handcross.
To Messrs. R. Wallace, Tunbridge Wells.

Silver Flora Medal.

To D. M. Baird, Esq., Drumoak, Aberdeenshire.
To Lt.-Col. R. W. Barclay, Bury Hill, Dorking.
To Carlyon Estates, Tregrehan, Cornwall.
To Messrs. J. Cheal, Crawley.
To Lord Clinton, Bicton, East Budleigh.
To Sir Ian Malcolm, Kilmartin, Argyllshire.
To Mr. W. C. Slocock, Woking.
To Messrs. J. Waterer, Sons & Crisp, Twyford.

Silver Banksian Medal.

To F. R. S. Balfour, Esq., Dawyck, Stobo, Tweeddale.
To the Duke of Bedford, Woburn Abbey, Bedfordshire.
To Messrs. W. Fromow, Windlesham.
To the Marchioness of Huntly, Orton Hall, Peterborough.
To Guy Coltman Rogers, Esq., Stanage Park, Bucknell, Radnorshire.
To Mr. F. Gomer Waterer's Knaphill Nursery, Woking.

Flora Medal.

To Mr. E. Dunkley, Crayford.
To Mr. H. Hemsley, Crawley.
To Mr. J. Hogger, Felbridge.
To the Rev. Mother Superior, Society of the Faithful Companions of Jesus, Poles, Ware.
To the Duchess of Northumberland, Albury Park, Guildford.

Banksian Medal.

To the Earl of Ducie, Tortworth Court, Falfield.
To R. Barclay Fox, Esq., Penjerrick, Falmouth.
To Charles Ball-Acton, Esq., Kilbride, co. Wicklow.

ORCHID SHOW.

NOVEMBER 3–4, 1931.

AWARDS.

The Schröder Challenge Cup, for the best exhibit of Orchids staged by an amateur.

To Robert Paterson, Esq., Ardingly, Sussex (Orchid grower, Mr. A. Merry).

The Orchid Challenge Cup, for the best exhibit of Orchids staged by an amateur in a space not exceeding 60 sq. feet.

To J. J. Joicey, Esq., F.L.S., F.Z.S., F.E.S., The Hill, Witley (gr. Mr. J. Mackay).

The Orchid Trophy, for the best exhibit of six Orchids staged by an amateur.

To J. McCartney, Esq., Hey House, Bolton, Lancs (gr. Mr. C. F. Potts).

NOVEMBER 24, 1931.

Silver Grenfell Medal.

To Mr. F. Galsworthy, Chertsey, for flower paintings.
To Mrs. C. Lugard, Dorking, for flower paintings.
To Mrs. A. C. Reeve-Fowkes, Eastbourne, for flower paintings.
To Mr. A. G. Stubbs, Hove, for flower paintings.

Grenfell Medal.

To Miss I. M. Charters, Leicester, for plant portraits.
To Miss M. I. Greenfield, Lindfield, for Orchid paintings.

A lecture was given by Mr. Clarence Elliott on " Plant Collecting."
Chairman, Sir William Lawrence, Bt., V.M.H.

DECEMBER 15, 1931.

Silver Grenfell Medal.

To Miss Anne Lawrence, Burford, Dorking, for flower paintings.

Grenfell Medal.

To Miss B. Matchwick, Reigate, for flower paintings.
To Miss D. Ratman, 46 Belgrave Road, S.W., for flower paintings.
To Miss J. Russell, 33 Cartwright Gardens, W.C., for flower paintings.
To Miss G. Thomasset, St. Mildred's Road, Lee, for flower paintings.

JANUARY 12, 1932.

Silver Grenfell Medal.

To Mr. A. G. Stubbs, Hove, for flower drawings.
To Mrs. W. F. Higgins, for orchid paintings.

Grenfell Medal.

To Miss L. E. Beedham, St. Albans, for flower paintings
To Miss M. C. Coleclough, Southampton, for paintings of New Zealand flora.

JANUARY 26, 1932.

Silver Grenfell Medal.

To Miss E. Savory, Sandgates, Chertsey, for flower paintings
To Miss J. Williams, Oakley Studios, Chelsea, for floral paintings.

Lindley Medal.

To Mr. T. Ashton Lofthouse, Middlesbrough, for dried specimens of plants collected in the South of Spain.

A lecture was given by Mr. H. Jolis on " Flower Decorations in the Home " (see p. 292).
Chairman, Mrs. Lindsay Smith.

FEBRUARY 9, 1932.

Silver Grenfell Medal.

To Miss B. A. Matchwick, Greencroft, Reigate, for flower paintings.
To Miss W. Walker, 28 Rivercourt Road, W. 6, for flower paintings.

Grenfell Medal.

To Miss M. I. Greenfield, Lindfield, for Orchid drawings.
To Miss G. Thomasset, St. Mildred's Road, Lee, for flower paintings.

A lecture was given by Mr. F. Jordan, V.M H., on " The Use of Cold Frames " (p. 230).
Chairman, Mr. Mark Fenwick.

FEBRUARY 23, 1932.

Grenfell Medal.

To Miss F. L. Bunyard, Maidstone, for fruit paintings.
To Miss E. Savory, Sandgates, Chertsey, for paintings of flowers.
To Miss Margaret Collyer, for paintings of wild flowers of Kenya.
To Mrs. P. A. F. Stephenson, 75 Carlisle Mansions, S.W., for flower paintings.

REPORT of the ONE HUNDRED AND TWENTY-EIGHTH ANNUAL GENERAL MEETING, held on Tuesday, February 23, 1932, in the Lecture Room, New Hall, Greycoat Street, Westminster.

The Hon. HENRY MCLAREN, C.B.E. (President), in the Chair, supported by Members of Council and about two hundred and twenty Fellows.

The SECRETARY read the notice convening the Meeting.

The Minutes of the last Meeting having been circulated, it was moved from the Chair and resolved that they be taken as read and adopted.

The PRESIDENT: I now rise, Ladies and Gentlemen, to move that the Report and Accounts for the year 1931 be and are hereby approved and adopted.

We Fellows can, I think, sincerely congratulate ourselves that in these somewhat difficult times the Society continues to enjoy prosperity. Its Shows during the year 1931 have reached a very high standard; our revenue shows a surplus over our annual expenditure of no less than £9,400; our membership stands at the imposing figure of 27,600. It is true that our membership has slightly decreased—by 414; but this, after all, is only 1½ per cent., and in these days of universally retrograde percentages I think that the decrease is refreshingly small. At the same time your Council have always desired to encourage new entries into our ranks. Fellows subscribing £1 1s., other than professional gardeners and persons living abroad, have to pay an entrance fee of £1 1s. on their election. Now £1 1s. to-day looms substantially larger in people's minds than it did some years ago, in spite of the fact that we are told that it is worth only about 14s.; and, in these circumstances, the Council have decided—as they are entitled to do under our bye-laws—that for the year 1932 no entrance fee shall be charged to new Fellows of the Society. It follows as a corollary to this decision that those persons who have joined the Society since the beginning of the year will have their entrance fees refunded to them. I do not think that the old Fellows of the Society will grudge new Fellows this additional privilege, and we trust that, in making this innovation for the year 1932, we have the sense of this Meeting in our favour.

I have said that our Shows reached a high standard. That applies especially to the Chelsea Show. That Show was honoured, as usual, by the presence of Their Majesties the King and Queen, and I think that it was the opinion of all who saw it that it was even better than any of its predecessors. The same remark as to the high standard applies, I think, to the Show held in the autumn in connexion with the Conifer Conference. That Show attracted wide interest, and a great deal of enthusiasm on the part of visitors, exhibitors, and those who listened to the very able papers that were read. I think that this proves one-third, at any rate, of the truth of the old proverb that "An Englishman loves a horse, a dog and a tree"—and among "Englishmen" we must most certainly include, on this occasion, both Scotsmen and Irishmen.

Turning to this current year, we have to record our deep regret at the loss of two noteworthy men who have contributed much to our exhibitions in the past—Mr. Vicary Gibbs and Mr. George Forrest, both of whom have died since the Report that you have in your hands was compiled. Mr. Vicary Gibbs was one of the greatest of all exhibitors, and one of the keenest of gardeners. He had purposed last October to put up one of his great exhibits of berried plants. Unfortunately, that particular show had to be postponed on account of the General Election, and the opportunity did not arise again. We shall feel the loss of Mr. Vicary Gibbs, not only as a Society but personally, as he was the friend of many of us. The death of Mr. George Forrest came at the very last lap of his race for plants, when the seeds from the last expedition that he ever intended to make were actually at hand. We owe a great deal to Mr. Forrest's plant collecting. We have had numbers of his plants before our Committees and they have received high awards. Mr. Forrest's name will be kept green in our memories by the fact that in future years we shall still have before us many plants of his as they come to flowering age.

This year at Chelsea the Council propose, with your permission, to make a new departure. As you know, Chelsea is open early on Wednesday, while judging takes place on Tuesday. Judging has to take place fairly early on the Tuesday afternoon in order that good light may be available, and it is completed as a rule about 4 o'clock. Now between 4 o'clock and dusk the Chelsea Show is at its best and its freshest, but there is no one to see it except Members of

the Committees, Judges and Exhibitors; and, if the truth be told of those three classes of people, their thoughts after their labours are usually directed rather towards the tea tent than to the plants. Your Council have, therefore, decided that the Fellows of the Society should be personally invited between 4 o'clock and dusk on that Tuesday to a kind of dress rehearsal of the Show. It was decided that the privilege must be strictly confined to Fellows personally and should not be transferable, but with this qualification—that Fellows who subscribe 2 or 4 guineas a year may be accompanied by one friend. The Council trust that this restriction will be strictly complied with in order to prevent overcrowding and in the interests of the Fellows themselves; and they hope that this innovation will commend itself generally to the Fellows.

A feature of horticultural progress in recent years has been the foundation of various kindred Societies, that is to say, Societies whose object is to serve the interests of various special plants. There are: The National Rose Society, the National Chrysanthemum Society, the National Dahlia Society, the Carnation Society, the Iris Society, the Alpine Garden Society, the Gladiolus Society, the Sweet Pea Society, the Rhododendron Association, the National Tulip Society, and one or two others. We welcome the co-operation of these Societies and we lend them our halls, rent free, when they desire to hold Shows. But there is one slight difficulty which is apt to arise.

These Societies very naturally desire to give awards to the plants in which they are interested. Now, when they give these awards, they sometimes give them under the same names, that is to say, Award of Merit or First Class Certificate, as does the Royal Horticultural Society. In these circumstances confusion is apt to arise and also there is apt to be a certain difference in the standard of the award. Your Council, therefore, have recently made endeavours to set up Joint Committees to give awards to plants, that is to say, Committees composed half of members appointed by your Society and half of members appointed by the kindred societies, so that only one award shall be given and so that the standard of award shall be kept up. We have now got Joint Committees with the Rhododendron Association, the Dahlia Society, the Iris Society and the Sweet Pea Society, and we hope by negotiations in due course to set up further Joint Committees. I am sure that this is a procedure of which you will approve.

I hear also that recently a Succulent Society has been founded under the Presidency of our friend Sir William Lawrence—at any rate he took the Chair at the preliminary meeting. Now Napoleon is reported to have said that you can do anything with a bayonet except sit on it, and that applies even more forcibly to a Cactus. We may see Sir William, as the Napoleon of the Cactuses, leading his serried ranks to our halls. If so, we shall look forward to his co-operation and shall try to conclude a treaty with him.

There is another class of plants which at present is not catered for by any kindred society, and that is the Lily family, probably because they are rather kittle-cattle to deal with. They are difficult to grow and do not, perhaps, appeal to as many people as they might. But those who do grow Lilies become quite mad with enthusiasm about them, and we have appointed a Lily Committee, with one of the greatest of enthusiasts, Mr. Stern, as Chairman of it, to look after the interests of the Lily family. They will not give Awards of Merit because Lilies flower over very scattered months of the year, but they are about to produce a Lily Year-Book, which will, of course, be published by the Royal Horticultural Society and will be on sale in the autumn of this year. They also propose to hold a Lily Conference under the auspices of the Royal Horticultural Society in the summer of 1933. We should like all Lily enthusiasts to prepare for that great day.

I would like now to say a word or two about Wisley. Mr. Harrow is now in the saddle at Wisley as Director, or perhaps I should put it more appropriately if I should say, metaphorically, that he is now wielding the spade at Wisley with the energy and skill which we expect from one who has done so much for the cultivation of plants at the Edinburgh Botanic Gardens. There will be some changes naturally in the Garden at Wisley, of which I hope you will approve. These changes will not be revolutionary ones; neither Mr. Harrow nor your Council wear red shirts. The changes will be improvements in the garden, based on the sound foundations laid by Mr. Chittenden, Mr. Harrow's predecessor. We propose, in the first place, to plant on the hill above the rock garden standard collections of Magnolias (this will be rather an experiment because of the climate), of flowering Cherries, and of Crabs. A good many flowering trees are already planted in the Wisley Garden, but we think it will be of interest to Fellows if standard collections are planted in orchard fashion, so that Fellows who visit the garden may have the opportunity of judging the various types of tree of the same age and growing in the same conditions.

Then we have in the past had a very large house devoted to a collection of Figs. On examination these Figs appear to have an antiquarian rather than a horticultural interest. We have always had these Figs, but a great many of the varieties are very much out of date, and we think that it would suffice if we kept two plants of each variety instead of devoting a whole house to them. These plants have been placed in the peach house and their house is now devoted to a collection of half-hardy shrubs which it is not possible to grow outside at Wisley. We propose to try there many of the new shrubs which have been from time to time introduced from China by the late Mr. Forrest and by Captain Kingdon Ward. I should like to acknowledge our indebtedness to Sir Arthur Hill, the Director of the Royal Botanic Gardens, Kew, for presenting to us a number of interesting plants to place in that house.

In connexion with our Lily Committee, and the Conference, we shall make an endeavour to grow a still wider range of Lilies than we have done in the past.

Then, again, we have a new policy in regard to students at Wisley, which was foreshadowed by Mr. Loder to you last year. We now propose to take men of more gardening experience than in the past—men who are rather older. We propose to pay them an allowance instead of asking them to work without remuneration, and in that way we think we will get men of more skill and we shall be able to ask them to work rather longer hours than was the case with the students whom we have had hitherto. That will enable us to have the same work done by fewer men. We propose to reduce the number of students to ten or twelve of this new class, and by reason of having this smaller number we shall be able to accommodate them in a hostel or bothy. We have a house which was purchased in connexion with the farm, a fairly large modern house, which we have redecorated and furnished and which makes an admirable hostel. That policy has been urged on us by prominent horticulturists in the past and we are glad that we are now able to carry it out. This change was initiated before Mr. Harrow took over, but he is entirely in agreement with it and he has helped us materially in the details.

In regard to our scientific work—there again we propose no revolutionary changes. We are being advised by a small Committee of scientists, who are distinguished both as scientists and as men of practical knowledge of horticulture. Our friend, Mr. Bunyard, is also associated with that Committee. They recommend us to turn the activities of the scientific staff at Wisley towards short-range investigations which have a direct bearing on horticultural progress. They suggest that we should not go in too much for abstract investigations but should conduct investigations which are likely to lead to practical results in a shorter time. This Committee is proceeding now to discuss details of this scheme with the Director of Wisley and the Keeper of the Laboratory.

I should like now to refer to the changing personnel of your Council. Mr. Musgrave is one of the members due to retire at this meeting, but, under the new bye-laws that were adopted a year or two ago, the Council have the power of saying that one of the three retiring members may be re-elected if the Fellows of the Society think fit. Apart from this power, as you know, the three retiring Members of Council are not eligible for re-election until a year has passed. The Council propose to use this power of dispensation in the case of Mr. Musgrave. He is Vice-Chairman of our Council and Chairman of the small Committee of the Council which acts as a liaison body between the Council and the Director of Wisley. He is qualified to and will act as our Treasurer for the coming year, and, lastly, he is absolutely indispensable to the work of the Council. I trust you will agree that the Council are fully justified in exercising that dispensing power in regard to Mr. Musgrave.

We regret to have to lose Mr. Trotter, our present Treasurer. He is a man with a real knowledge of finance; a man who is never afraid to put the £ *s. d.* point of view before the Council; a man who has always seen that we measure our cloth before we cut our coat. We hope very much that Mr. Trotter may return to us again at the end of the twelve months.

Lastly, we lose the services of our friend Mr. Sutton,—a man who has put his ripe experience and sound judgment freely at the disposal of the Council; but we are very glad to learn that he is prepared to take the honourable office of a Vice-President of the Society, and I think that it will be an honour to the Society if a man whose name is so intimately connected with horticulture as Mr. Sutton is elected—as he will be at to-day's meeting—to the office of Vice-President.

To the two vacancies thus created we shall welcome, in the first place, our old colleague Mr. Oldham,—also a man of great experience who has already served five years on the Council and has proved of the greatest use to us. We shall also welcome a new member, General Sir John Du Cane, who has won distinction in many fields and also in many gardens, because he is a keen gardening man and

comes of a great gardening family. We are very much indebted to such a busy man who is prepared to put his services at the disposal of the Society.

Lastly, Ladies and Gentlemen, I want to make a suggestion to you, or, rather, an appeal. Nurserymen at the present time are having a very difficult time. Not only are there many fewer new gardens being laid out, not only are people not now considering substantial extensions of their gardens, all of which operations, of course, demand new plants, but orders for the ordinary annual replacement of plants are being very substantially cut down, so I am told. Now, the ordinary manufacturer, when his sales fall off, although, of course, he still has his overhead charges to meet, can balance his accounts to some extent by not making the articles he cannot sell. But the nurseryman is in an entirely different position. He has his plants growing in the nursery all the time. They must be cultivated, watered, weeded, and transplanted. Propagation has to be carried on because you propagate for sales five or six years in advance, and if you do not carry out all that work in the nursery, your nursery and your business go to pieces. I would, therefore, appeal to my fellow-gardeners not to cut down their expenditure on plants this year more than is absolutely necessary to them. I do it on three grounds. Firstly, in fairness to the nurserymen. Secondly, on the more selfish ground that, in our gardens the plants furnished by nurserymen provide the raw material for our art and our craft, and that, if nurseries deteriorate, if hybridization is given up and plants are neglected, it will have a bad effect on our gardens for years to come. And thirdly, I appeal to you as President of the Society. The prosperity of this Society depends on the success of our Shows, and the success of our Shows depends on the enterprise of our nurserymen. We are partners in this great enterprise of the Royal Horticultural Society, and it would be very bad if one partner were allowed to fall into a position where he could not pull his weight.

I therefore appeal to you very earnestly to give to the horticultural trade—and to the British horticultural trade—your very best support in these hard times.

Mr. TROTTER : I have much pleasure in seconding the Adoption of the Report and Accounts.

During 1930 the Council decided to alter the form of the Society's Accounts and Balance Sheet. The various alterations appeared in the figures which Fellows had before them in the Book of Arrangements for 1931.

At the Annual Meeting last year I endeavoured to explain these alterations in considerable detail, and in doing so I fear most of those who listened to me must have wished I would sit down and allow the President to get on with the far more interesting parts of the agenda—such as the V.M.H. and Associates of Honour presentations. The explanations were published in full in the JOURNAL for those who wished to follow them in detail.

I propose this year to give you only a very short survey of the main changes in our figures and not to inflict the details on you again.

" Chelsea Show." We had to spend £850 on improvements to the water supply and cloakrooms, which accounts for the increase in " Expenses and Labour " item, gate takings fell by £1025, nearly all in the first day 10*s*. entrance payments, and the result was that the Show cost the Society £1297 instead of showing a profit as in former years.

" Botanical Magazine." Sales of old stock during the year were good and amounted to £787, and sales of the new volume to £691, with the result that the net cost was reduced by £223 to £336. The back numbers of the *Botanical Magazine* should prove a very good investment—better perhaps than many others we make at the present time.

" Restaurants." The actual loss on working is £54, the remainder of the total being allocation of the share of overhead expenses. The loss is the cost of the convenience to Fellows of being able to have a meal on the premises, and should largely disappear when they realize what a comfortable and convenient place it is in which to meet their friends and discuss the Show.

I now come to a big change in the form of the balance sheet :

" Capital Funds Account and General Reserve Account " being represented now only by the buildings of the two Halls, it has been considered best to amalgamate them into one figure, corresponding to the one figure of £245,227 on the other side of the balance sheet. Before finally amalgamating them, however, we have transferred an amount of £2,549 from the assets side—old Hall capital expenditure—and deducted it from the general reserve account. This represents a number of items which are more strictly repairs and renewals—such as renewals of defective drainage £220, and water services £393, heating services £500, and repairs to lead roof £150.

We have added £9,403, the balance of the annual revenue and expenditure account, and transferred the whole amount, £192,907, to the top of the page, where, with the capital funds account, it will be shown in future as one item, now £231,854.

On the assets side you will see that the figure £245,227, after additions during the year and the transfer to which I have just alluded, shows the total capital expenditure on both Halls, which are now completed.

"Westminster Bank Overdraft, £10,142," though a reduction of £5,852 compared with the last balance sheet figure, shows that we have still to pay off the balance of our recent heavy outlay on the Halls, and as our receipts do not yet cover this, we had to draw on our bankers for a few months at the end of the year, pending receipt of subscriptions.

"Wisley." The new arrangements only came into force in October and, therefore, do not show in the accounts you have before you. Until these are in full working I do not think estimates of what they will cost or what amounts should be saved are of any value. The Wisley Committee of the Council are investigating very carefully what can and should be done in the direction of economies, and the new Director has had a long experience to guide him in his recommendations to the Council.

Our Auditor, Mr. Feather, has again prepared some very detailed analyses of the accounts, which I shall be pleased to show after the Meeting to any Fellows who may be interested.

Ladies and Gentlemen,—We are living in times probably without parallel in the history of the world, but this great Society will continue to grow—faster or slower according as its present members exert their influence in persuading their friends that there are few opportunities of getting better value for their money than by joining the R.H.S. Its position is sound, as I feel sure those of you who have studied the accounts will agree. We want still more members, so that we can continue to encourage the growing of food and flowers which are the envy of all other countries.

I now beg to second the Report.

The CHAIRMAN: Before I put the motion, does any Fellow desire to ask a question?

Mr. WALLACE: I would like to congratulate the Society on its financial statement in such a period as we have gone through. I congratulate the Treasurer on the fact that, in about twelve months going, he will probably be out of deep water. I also rise on behalf of myself and my fellow-traders who are interested in horticulture to thank you, sir, most warmly and heartily for the remarks you have made in regard to the horticultural trade. I do not ever remember any such sympathetic references to horticultural traders as have fallen from your lips to-day. In voicing the feelings of those interested in horticulture I say that we offer you our heartfelt thanks for your very kind and generous remarks on this occasion.

I would also offer one other word of thanks on behalf of the Horticultural Club, which is now able to occupy a room in this building, for which thanks are due to your Council.

The motion that the Report and Accounts for the year 1931 be and are hereby approved and adopted was then put, and was carried unanimously.

Mr. MUSGRAVE: There is only one nomination for the Presidency, and therefore, under Bye-law 59, I declare Mr. McLaren duly elected President for the ensuing year. (Applause.)

The Hon. HENRY MCLAREN: Ladies and Gentlemen,—I feel I need hardly say that I am very greatly honoured by that unanimous nomination, and I can only plead in extenuation of my various shortcomings in that position that I will do my best—bad though that may be.

I now declare the following elections to the offices named of gentlemen who have been duly nominated and in the absence of other nominations fall to be elected:

As Vice-Presidents:—

The Duke of Bedford.
The Duke of Portland.
The Viscount Ullswater.
Sir James Knott, Bt.

Rt. Hon. Sir Herbert Maxwell, Bt.
Sir Daniel Morris.
Lt.-Col. Sir David Prain.
Mr. E. A. Bowles.
Mr. G. W. E. Loder.
Mr. L. G. Sutton.
Mr. J. C. Williams.

As Members of the Council :—

General Sir John Du Cane.
Mr. C. T. Musgrave.
Mr. W. R. Oldham.

As Treasurer, Mr. C. T. Musgrave.

As Auditor, Mr. J. S. Feather, of Messrs. Harper, Feather & Paterson.

The Victoria Medal of Honour :—

The SECRETARY : **The Victoria Medal of Honour** has been awarded to Lady Aberconway, and it is a great privilege for me to give this medal to our President and to ask him to hand it on to Lady Aberconway, who, unfortunately, is not able to be present here.

The PRESIDENT : Lady Aberconway desires me to say that she appreciates most deeply this honour which the Society has conferred upon her. I can only say that it would have been a very great personal pleasure to me to have handed to her, on behalf of the Society, this recognition of her work, because it is from her and from her garden that I have learned all that I know of gardening.

Victoria Medal of Honour.—To Mr. W. Dallimore, for his work on conifers, trees and shrubs.

The CHAIRMAN : Mr. Dallimore, your work has been most distinguished. Your book is a text-book which we value and consult, and we are further indebted to you for the assistance you gave to us in unravelling the tangled names of Conifers at our recent Conifer Conference.

Victoria Medal of Honour.—To Mr. P. R. Barr, in recognition of his work in connexion with Daffodils, Tulips and other bulbous plants.

The PRESIDENT : We all regret Mr. Barr's absence. Mr. Barr's name is a household word in connexion with bulbs, and we shall all wish him a speedy recovery.

The Associateship of Honour was then conferred on the following :—

Mr. T. W. ANDERSON, thirty-six years with Messrs. Laxton Bros. of Bedford, supervising the growing of their nursery stock and including the firm's famous novelties of new fruits.

Mr. A. ANDREWS, who has assisted in the creation of the fine parks and gardens at Plymouth.

Mr. J. W. BESANT, Keeper of the Botanic Gardens at Glasnevin. [Unable to be present.]

Mr. C. BLAIR, head gardener to Mr. Seaton Murray Thomson since 1901. [Unable to be present.]

Mr. P. C. BLAIR, in charge of the gardens at Trentham, belonging to the Duke of Sutherland, from 1887 until they were closed in 1915.

Mr. E. U. BREW, foreman to Messrs. Charlesworth since 1899.

Mr. A. BULLOCK, head gardener at Copped Hall Gardens for thirty years.

Mr. J. CAMERON, who has served as head gardener for three proprietors at Auchterarder. [Unable to be present.]

Mr. A. W. COATES, head gardener to Mr. G. W. E. Loder for twenty-seven years.

Mr. C. H. COOK, head gardener to the Royal Gardens at Windsor.

Mr. J. J. DAVIDSON, head gardener for twenty-six years to Sir John Reid at Ardencraig.

Mr. J. HOARE, foreman to Messrs. J. H. White of Worcester for fifty-four years. [Unable to be present.]

Mr. A. HOSKING, on retirement from his work at the John Innes Horticultural Institution from 1919 to 1931.

Mr. T. J. P. JEARY, thirty-two years with Messrs. Geo. Monro.

Mr. J. JONES, former Curator of the Botanic Gardens at Dominica. [Unable to be present.]

Mr. G. T. LANE, retired Curator of the Royal Botanic Gardens, Calcutta, 1895 to 1924.

Mr. E. LONG, Superintendent of the Government Gardens, Simla, India. [Unable to be present.]

Mr. F. W. MCDONALD has spent fifty years in service with Messrs. Sutton from 1869.

Mr. J. V. MACDONALD, gardener to Sir George Kenrick.

Mr. D. F. MCINTOSH, foreman with Messrs. Bath of Wisbech.

Mr. A. MACRAE, Chief Superintendent of the Parks Department, Dundee, since 1908.

Mr. T. D. MAITLAND, Superintendent of the Botanic Gardens at Victoria in the British Cameroons. [Unable to be present.]

Mr. J. W. MATHEWS, Curator of the Botanic Gardens, Kirstenbosch, South Africa. [Unable to be present.]

Mr. T. PATEMAN, head gardener, first at " The Node " and then at Brocket Hall, with Sir Charles Nall-Cain, Bt., since 1906.

Mr. W. J. PRITCHARD, foreman and right-hand man to Mr. Beckett, the veteran gardener to the Hon. Vicary Gibbs at Aldenham House.

Mr. T. W. TAYLOR, Curator of the Royal Botanic Gardens, Kew. [Unable to be present].

Mr. R. O. WILLIAMS, Superintendent of the Royal Botanic Gardens, Trinidad. [Unable to be present.]

The Lawrence Medal.—To Messrs. Sutton & Sons, Ltd., for their exhibit of flowering plants from seeds staged at Chelsea.

The Holford Medal.—To the Marquess of Headfort, for his exhibit of Conifers staged at the Conifer Conference Exhibition on November 11 and 12.

Veitch Memorial Medal in Gold.—To the Marquess of Headfort, for his paper and exhibits of Conifers at the Conifer Conference.

Veitch Memorial Medal in Gold.—To Dr. O. Stapf, on the completion of the publication of the " Index Londinensis " to the year 1920.

Veitch Silver Medal and £25.—To Dr. L. Cockayne, for his work in the advancement of horticulture.

The Sander Medal.—To Baron Bruno Schröder for his *Sophrolaeliocattleya* × *Shilliana*, which was shown on December 15, 1931.

The George Moore Medal.—To Messrs. Sanders, for *Cypripedium* × *Delenatii* which was shown on March 10, 1931.

The Williams Memorial Medal.—To Mr. R. Paterson, for his group of Miltonias staged on June 30, 1931.

The Williams Memorial Medal.—To Messrs. Dobbie & Co., for their group of Dahlias staged on September 23, 1931.

The Cory Cup.—To Mr. Preston of the University Botanic Gardens at Cambridge, for *Rosa* × *cantabrigiensis*, which was shown on June 2, 1931.

The Loder Rhododendron Cup.—To Captain F. Kingdon Ward, for his introduction of new species of Rhododendrons. [Unable to be present.]

Ladies and Gentlemen,—That concludes our presentations. I should like to thank, on behalf of the Society, all those gentlemen collectively for their services to horticulture. Although I know in their case the work is its own reward, it is a very great privilege to be able to give them some recognition on behalf of the Royal Horticultural Society.

Mr. J. W. BARR here handed in a Paper on " Co-ordination between the Existing Regional and other Research Stations and Practical Horticultural Interests," which the Chairman undertook to lay before the Council at its next meeting.

Sir FREDERICK MOORE: It needs no words of persuasion from me when I ask you to join in a hearty vote of thanks to our President, who has so worthily occupied the chair at this meeting. There are few societies which could present such a report, so precisely and lucidly put before you, and such a balance sheet, instead of the dismal remark: "The Directors are sorry to report . . ." Those connected with the work of the Society will acknowledge that such results cannot be achieved without a guiding hand such as we have had in the President occupying the chair. It is no blarney to say that we are very grateful to our President for all he has done for our Society and for coming here to-day to read such a favourable report, and give us such encouragement. It only remains for you to join with me in conveying to him our grateful and sincere thanks.

The Rev. ROLLO MEYER: I second this vote of thanks to our Chairman. Clergymen have great experience of Chairmen, and I am quite sure that you all feel with me that we could not have had this afternoon a Chairman who knew his work better and did it in such a masterly, charming, sympathetic and tactful way. I beg to second this vote of thanks.

The CHAIRMAN: Sir Frederick Moore and Mr. Meyer, I am very much indebted to you for the kind things you have said about me. The more they are undeserved, the more such things are appreciated. I thank also the Fellows of the Society for the cordial way in which they have received this vote of thanks. I can only say that I esteem it a very great privilege to occupy this Chair, and I shall always do my very best in the interests of your great Society.

The meeting then terminated.

REPORT OF THE COUNCIL FOR THE YEAR 1931.

1. **The Year 1931.**—The year 1931 will be remembered for the successful Conifer Conference held in November, and it is a matter of satisfaction that, in a difficult season, the high standard of exhibits at the Society's Shows has been so well maintained.

2. **Numerical Strength.**—

Loss by Death in 1931.		Fellows Elected in 1931.	
Honorary Fellows	6	Honorary Fellows	2
Life Fellows	10	Associates of Honour	45
4 Guinea Fellows	3	Life Fellows	12
2 ,, ,, ...	220	4 Guinea Fellows	12
1 ,, ,, ...	164	2 ,, ,, ...	988
Associates	5	1 ,, ,, ...	927
	408	Associates	72
Loss by Resignation.		Affiliated Societies	45
4 Guinea Fellows	13		2,103
2 ,, ,, ...	1,107	Deaths and Resignations ...	2,517
1 ,, ,, ...	885	Fellows elected	2,103
Associates	54		
Affiliated Societies	50	Net Decrease	414
	2,109	Total on November 11, 1930	28,026
		Total on November 10, 1931	27,612

3. **Obituary.**—It is with great regret that the Council records the loss of the following distinguished Honorary Fellows of the Society: Mr. Albert Burrage, the President of the American Orchid Society; Professor J. Eriksson, Director of the Botanical Section of the Central Agricultural Station of Stockholm; Mr. Donald Macdonald, the horticultural reporter of the *Daily Telegraph* for a great number of years; Dr. C. H. Ostenfeld, Director of the Botanic Gardens, Copenhagen; and Hofrat Dr. Richard Wettstein, the founder of the Vienna Botanical Institute and Gardens. Among the many other Fellows that the Society has lost are Mr. J. G. Millais, holder of the Victoria Medal of Honour, who will always be remembered as an enthusiastic amateur gardener and for his books on Rhododendrons and Magnolias; Mr. A. J. Bliss, a distinguished raiser of Irises; Dr. T. F. Chipp, Assistant Director of the Royal Botanic Gardens, Kew; Mr. Charles E. Shea, a former Member of Council and Vice-Chairman of the Floral Committee; Mr. A. J. Sewell, who presented and generously endowed the Sewell Medals for exhibits of plants suitable for a rock garden or alpine house; Mr. G. Tinley, a member of the Fruit and Vegetable Committee and Secretary of the Horticultural Club; and Mr. F. R. Newbold, the Secretary-Treasurer of the Horticultural Society of New York.

4. **Fortnightly Meetings and Shows.**—The Fortnightly Meetings and Shows at the Halls have been well attended. The comparative attendance has been: 1929, 99,923; 1930, 115,963; 1931, 106,523. In order to extend the usefulness of these meetings, it has been decided to increase the number of two-day shows, and to hold them throughout the period from March to the end of July. It has, further, been decided to keep the Hall open until 9 o'clock in the evening on the first days of the two-day shows. It is hoped that these additional facilities will be appreciated, not only by those of the Fellows, but also by those members of the general public who desire to visit the shows outside the ordinary routine hours of daily work.

5. **Show of British-grown Bulbs.**—In order to encourage the bulb-growing industry in the British Isles the Council has decided to arrange an exhibition of British-grown Bulbs on September 6.

6. **Lectures.**—The alteration of the time of the lectures from 3 to 3.30 appears to have been appreciated by the Fellows, and the average attendances have been good. An attractive lecture programme has been arranged for the coming year, the Institute of Landscape Architects again kindly assisting with lectures on Garden Design.

7. **The Daffodil Show.**—The season, with its cold, bleak, spring winds, was unfavourable to Daffodils, but, nevertheless, although the exhibits at the Daffodil Show were fewer in number, their quality and excellence were well maintained. In 1932 the Show will be held on Thursday and Friday, April 14 and 15.

8. **The Chelsea Meeting.**—The Chelsea Meeting was held on May 20, 21, and 22, and was again honoured by the gracious visit of their Majesties, the King and Queen. The Show was as magnificent as in previous years, and it is believed that the improvements in the arrangements added to the general comfort of visitors. In 1932 the Show will be held on Wednesday, Thursday and Friday, May 25, 26 and 27.

9. **New York Horticultural Society's Cup.**—The handsome silver cup, to be won outright, and presented by the Horticultural Society of New York, took the place this year of the Sherwood Cup for the best exhibit at the Chelsea Show. This cup was awarded to Messrs. Sutton & Sons for their splendid group of flowering plants raised from seeds.

10. **The Amateurs' Flower Show.**—The seventh Amateurs' Flower Show was held on June 23. The popularity of this Show was well evidenced not only by the number of exhibits but by their quality. In 1932 the Show will be held on Tuesday, June 28.

11. **The Autumn Shows.**—Her Majesty the Queen graciously honoured the Show of Ornamental Trees and Shrubs with a long visit.

The number of exhibits at the Fruit and Vegetable Show, although of a high standard, were somewhat below those of the last two years owing to the season being rather a poor one for fruit.

It is with regret that the Council must again report that it has been impossible to find suitable premises in which a combined Autumn Show can be held. It has, therefore, been decided to continue in 1932 the series of four autumn shows, arranged as follows: (*a*) Open-air plants and roses; (*b*) ornamental trees and shrubs; (*c*) fruit and vegetables; and (*d*) orchids and stove and greenhouse plants. It has been decided to hold all these four shows on Tuesdays and Wednesdays in 1932, September 20 and 21; September 27 and 28; October 4 and 5; and October 11 and 12.

12. **The Coronation Cup.**—The Coronation Cup for the best exhibit of any plant or plants other than roses at the Autumn Show on September 23 and 24 was awarded to Messrs. Dobbie & Co. for a group of Dahlias.

13. **Conifer Conference.**—The Conifer Conference, with its Exhibition, was held on November 10, 11 and 12. On November 10 the Society's President, the Hon. Henry D. McLaren, President of the Conference, welcomed a well-attended meeting of conifer lovers and forestry experts.

The Tuesday afternoon, the whole of Wednesday and the Thursday morning were devoted to the reading of papers and to discussions, the subjects of which reviewed the cultivation of conifers at home, overseas, and abroad, and their propagation, nomenclature, diseases, economic uses and chemistry.

On Wednesday and Thursday, November 11 and 12, magnificent collections of conifers—growing specimens and cut branches—staged by owners of private gardens, by the Royal Botanic Gardens, Kew, and by the members of the trade—were arranged in the New Hall. The Society may rightly congratulate itself on the comprehensiveness of this exhibition of conifers, which was on a scale that has never before been attained. In addition, on the dais, there were arranged fine collections of photographs of growing trees kindly lent by private owners, the Director of the Imperial Institute, the Director of the Arnold Arboretum, the Press and others, and an exhibit of the economic uses of conifers by the Director of the Royal Botanic Gardens, Kew.

The Council desires to take this occasion to place on record its grateful thanks to the members of the Committee, readers of papers, owners of private gardens (both for their exhibits and also for the valuable statistics of the trees growing

on their estates), the Director of the Royal Botanic Gardens, Kew, the Director of the Imperial Institute and the Director of the Arnold Arboretum, and to the members of the trade for their co-operation.

The report of the Conference, entitled "Conifers in Cultivation," containing the papers, the statistics of conifers growing in Great Britain and Ireland, a description of the Exhibition and a list of the awards, is being published, and may be obtained from the Society for 21*s.* post free.

14. **Foundation Plaque.**—A bronze plaque, stating that "At Messrs. Hatchard's in a house on this site the Royal Horticultural Society was founded on the 7th March, 1804," is being placed on the present building in Piccadilly, which is still in possession of the firm, and an illuminated document on vellum giving fuller particulars will be hung in the shop itself. The designs have been prepared by Mr. A. E. Henderson, F.S.A., F.R.I.B.A.

The Council wishes to extend its thanks to Messrs. Hatchard for their kind permission to carry out this work.

15. **Joint Committees.**—During the year two further joint Committees with kindred societies have been formed, one with the British Gladiolus Society, and the other with the National Sweet Pea Society. The Council is particularly desirous of encouraging the formation of joint Committees, in order that the mutual interests of the Society and of the kindred societies may be furthered.

16. **Lily Committee and Conference.**—The Council has appointed a Lily Committee which will deal with Lilies, Nomocharis, Fritillaries and their hybrids. It will be the duty of the Committee to encourage the cultivation and production of Lilies, to register hybrids, and to edit a year book. It has been decided to hold a Conference on Lilies in July 1933.

17. **Wisley.**—On October 1 Mr. Harrow took up his appointment as Director of the Wisley Gardens. A small committee of the Council, consisting of Messrs. Bunyard, Hay, and Musgrave, with the President and Treasurer as *ex officio* members, has been appointed to confer with the Director as to the work of the gardens; while Sir Daniel Hall, Sir Arthur Hill, Professor Blackman and Dr. Rendle have consented to confer with the Director and the Keeper of the Laboratory on the work of the scientific staff. The Council, as a whole, accompanied by certain Fellows of technical and horticultural experience, who at present are members of the Wisley Garden Committee, will visit the gardens periodically for the purpose of informing themselves of the progress of the work at Wisley.

In spite of the wet weather of the past summer the number of visitors to Wisley has shown no diminution, whether as private or as organized parties. Among the latter should be mentioned a large party of members of the British Association for the Advancement of Science who visited the gardens on the occasion of the Centenary of the Association. They were entertained to tea by the Council.

18. **Investigations and Experiments.***—During the year the time of the scientific staff has been concentrated on the experimental work previously initiated, and no new line of investigation has been undertaken.

Mr. Tincker has continued his study of the effect of various periods of light upon the growth of garden plants, paying more particular attention to the rate of formation of tubers. The estimation of the growth of certain annual vegetables in different soils has now been carried on for three seasons, and chemical data have been collected both from the soils and the plants by Dr. Darbishire. It is now proposed to grow perennial plants in these soils, so that information regarding the behaviour of certain fastidious species may be collected. The tests made of glass transmitting ultra-violet rays have been concluded. Further problems for elucidation arise out of the observations made upon the germination of rosaceous and other seeds.

Dr. Darbishire and Mr. Buxton have extended the range of varieties of fruits and vegetables in which they have tested the relative acidity at varying stages in the ripening processes. Dr. Darbishire has continued his examination of the influence of certain chemical solutions upon the rooting and after-growth of cuttings.

* See JOURNAL, vol. **56**, pt. i., "Black Spot of Roses," by D. E. Green, M.Sc.; "Insects associated with Seeds of Garden Plants," by G. F. Wilson, N.D.H., F.L.S.

Mr. Fox Wilson has made further observations upon the pollinators of fruit trees.

The investigations of the Stem-Eelworm attacking herbaceous plants have included the study by means of cross-infection of the different strains of this pest.

In a garden such as Wisley the incidence of attacks made by insects of the local fauna upon exotic plants recently introduced into the garden demands the continued attention of the entomologist. A complete index of host-plants, the seeds of which are attacked by the seed beetles (*Bruchidae*), is in course of preparation.

The parasite of the White Fly has been cultivated and widely distributed to Fellows and others who have applied for material.

Mr. Green has under investigation various diseases of bulbous plants. This year he has commenced an investigation upon the Smut Disease of Dahlias, a trouble new to this country. Together with the entomologist he has continued his investigations of the diseases of Freesias.

The widely adopted method of treating by means of hot water Narcissus bulbs infected with eelworm frequently produces abnormal flowers, and Mr. Gould is examining a number of varieties of Narcissus in the endeavour to determine the common growth stage, if any, at which this " sterilization " may cause the minimum subsequent damage. Other investigations in his charge are concerned with certain fungus diseases of Narcissus.

Trials of spraying machinery, sprays, insecticides and fungicides have been continued.

Much time has been spent by the Laboratory Staff in diagnosing diseases and parasitic attacks on plants sent by Fellows for examination.

19. **Trials.**—The Standard Collections of flowering plants continue to prove their usefulness alike to visitors and to judges of new plants. There are now Standard Collections of all the plants given in the "Book of Arrangements," * save of Pyrethrums. Pyrethrums appear in the Trials Calendar for 1932, and a collection of these plants will be assembled.

The trials brought to a conclusion during the year 1931 include those of Primroses, Violas, Annual Scabious, Antirrhinums, Ipomoeas and Convolvulus (which the cool summer did not favour), Hemerocallis and Zonal Pelargoniums among flowers; and Celery, Tomatos, Shallots, Parsnips, Maincrop Peas and Potatos among vegetables. Reports on these trials will be found in the JOURNAL, together with interim reports on trials of Narcissi, Dahlias and Irises. In the cases of plants of which Standard Collections are maintained, there are continuous trials, such new varieties as are selected at Vincent Square for trial being planted side by side with the older varieties, and judged when they mature. These trials thus afford a means of comparison between the old and the new and also serve to display the best varieties available.

20. **Fruit for Commercial Purposes.**—A report on the trials conducted under a joint committee of the Society and the Ministry of Agriculture and Fisheries is being prepared for publication. The crops of the best varieties have again been excellent. The propagation of new varieties for distribution for further trial to the ten sub-stations has been continued.

21. **School of Horticulture.**—It has been decided gradually to remodel the School of Horticulture on the lines of the educational system so successfully carried on at Kew, Edinburgh and the John Innes' Horticultural Institution. Under this system student gardeners are being selected according to their qualifications and experience. They will undertake the ordinary routine work of the gardens and receive instruction by way of practical demonstrations and lectures. In return for their labour they will be paid a maintenance allowance.

22. **Hanbury Memorial.**—On March 23 a memorial, placed by the Society in the hall of the Laboratory, to Sir Thomas Hanbury, K.C.V.O., to whom the Society owes the use of the Gardens, was unveiled by Mr. Cecil Hanbury, M.P., in the presence of other members of his family and of the Council.

23. **Memorial Trees.**—On the same day Memorial Trees were planted by Mr. G. W. E. Loder to commemorate his Presidency of the Society, *Davidia involucrata* being planted in Howard's Field, and three plants of the Japanese Hornbeam on the hill above the Laboratory.

* See p. 80, " Book of Arrangements," 1932.

24. **The Garden.**—The great collection of Berberis species and hybrids has been one of the outstanding features of the Garden during the past summer with its fine effects in flower and in the richness of variety and colour of the fruit and foliage in the autumn.

During the past few years many choice and interesting plants have been established in the wood and provide much of interest to the visitor. The springtime opens with broad drifts of *Narcissus cyclamineus*, to be followed by masses of the wood-loving Primulas, such as *P. helodoxa*, *P. pulverulenta*, *P. Bulleyana*, *P. Beesiana*, *P. japonica*, *P. burmanica*, and others of the candelabra type. Meconopsis in many species are now quite at home in this part of the garden together with the Rhododendrons and Azaleas in great variety. Later the large spreading clumps of *Shortia galacifolia* and *Schizocodon soldanelloides* show that they have adapted themselves to their surroundings and add to the general interest. In the summer the Lily grower will also find many shade-loving Lilies in full health and vigour, while in the autumn the broad plantings of *Cyclamen neapolitanum* are a great feature.

Of the many shrubs to be seen in the Wood, *Cyrilla racemiflora*, over 7 feet high, is worthy of special mention, and during the past year a number of rare plants have flowered in the gardens. These include *Primula Locsii* and *P. eucyclia*, which are amongst the rarest species in cultivation, and a fine cream form of *Meconopsis betonicifolia*.

The exhibition of some of the results of experimental work which has formed a feature of the Chelsea Show for some time past was repeated in 1931, and small exhibits dealing with special points were arranged at some of the meetings at Vincent Square. A large group of the newer varieties of apples was exhibited at the Imperial Fruit Show at Manchester in October. It created much interest among fruit growers, who thus had an opportunity of seeing some of the most promising of recently raised fruits.

25. **Masters Memorial Lectures.**—The Masters Memorial Lectures were given by Professor Dr. Baur on April 8 and 9, on "New Scopes and New Methods of Plant Breeding" and "The Problem of Evolution." The Council desires to record its thanks to Dr. Baur both for his lectures and for his invitation extended to those who are interested in these branches of science to visit his laboratories at Müncheberg i/M. In 1932 the lectures will be given by Sir Frederick Keeble, C.B.E., Sc.D., F.R.S., on Tuesday and Wednesday, May 10 and 11, on "Garden Fertility: Its Origin and Maintenance."

26. **The Society's Publications.**—In the early months of the year the last volume of the "Index Londinensis to Illustrations of Flowering Plants, Ferns and Fern Allies," was published, and Dr. Stapf, the Editor, is to be congratulated on the great work which he has completed. A Supplement for the fifteen years 1920 to 1935 is in preparation.

Four parts of "Curtis's Botanical Magazine" have been issued; and the companion volume, "Curtis's Botanical Magazine Dedications, 1827–1927: Portraits and Biographical Notes," generously undertaken by Mr. Wm. Cuthbertson, V.M.H., has been published.

"The Genus Sempervivum," by Dr. R. Lloyd Praeger, will shortly appear. The revised "Classified List of Daffodil Names" will be prepared during the coming year.

27. **Lindley Library.**—During the year 1931 about 285 books, pamphlets, etc., have been added to the Library, among which the following may be mentioned: Balfour's "Botany of Socotra," Bicknell's "Flowering Plants and Ferns of the Riviera," Blackwell's "Curious Herbal" (2 vols.), Comolli's "Flora Comense" (7 vols.), De Bry's "Anthologia Meriana," de Candolle's "Plantarum succulentarum historia," Duhamel's "Traité des arbres et arbustes" (7 vols.), Hooker's "British Jungermanniae," Lindeman's "Bilder ur Nordens flora" (3 vols.), Mann's "Deutschlands wildwachsende Arzney-Pflanzen," Planson's "Iconographie du genre œillet," Schimper's "Bryologia Europaea" (6 vols.), Tournefort's "Voyage into the Levant" (2 vols.), Vergnaud's "L'art de créer les jardins," Wilson's "Aristocrats of the Trees," Wilson's "If I were to make a Garden."

28. **Expeditions.**—The Society has taken a share in two further expeditions in search of new and valuable horticultural plants: in Mr. Clarence Elliott's expedition to Western North America, and in Dr. Noel Humphrey's expedition to the Ruwenzori Mountains.

Seeds from the expeditions of Mr. Clarence Elliott, Mr. George Forrest, V.M.H., and Captain Kingdon Ward are arriving.

29. **The Victoria Medal of Honour.**—The Victoria Medal of Honour has been awarded to Lady Aberconway, C.B.E., for her great interest in the advancement of horticulture and in the cultivation of new and rare plants; to Mr. Peter R. Barr in recognition of his work in connexion with daffodils, tulips and other bulbous plants; and to Mr. W. Dallimore for his work on conifers, trees and shrubs.

30. **The Associateship of Honour.**—The Associateship of Honour has been conferred on Messrs. T. W. Anderson, A. Andrews, J. W. Besant, C. Blair, P. C. Blair, E. U. Brew, A. Bullock, J. Cameron, A. W. Coates, C. H. Cook, J. Davidson, J. Hoare, A. Hosking, T. J. P. Jeary, J. Jones, G. T. Lane, E. Long, F. W. McDonald, J. V. Macdonald, D. F. McIntosh, A. Macrae, T. D. Maitland, M.B.E., J. W. Mathews, T. Pateman, W. J. Pritchard, T. W. Taylor, R. O. Williams.

31. **The Lawrence Medal.**—The Lawrence Medal for the best exhibit staged at the Society's Shows during the year has been awarded to Messrs. Sutton & Sons, Ltd., for their exhibit of flowering plants raised from seeds at the Chelsea Show.

32. **The Holford Medal.**—The Holford Medal for the best exhibit of plants and/or flowers (fruit and vegetables excluded) shown by an amateur during the year in the Halls of the Society has been awarded to the Marquess of Headfort for his exhibit of Conifers at the Conifer Conference Exhibition.

33. **The Veitch Memorial Medals.**—Awards have been made as follows: A gold medal to the Marquess of Headfort for his paper and exhibits of Conifers at the Conifer Conference, 1931, together with £5 to his gardener, Mr. J. A. Boyle; a gold medal to Dr. Stapf on the completion of the publication of the "Index Londinensis" to the year 1920; a Silver Medal and £25 to Dr. L. Cockayne, C.M.G., F.R.S., for his work in the advancement of horticulture.

34. **The Cory Cup.**—The Cory Cup has been awarded to University Botanic Gardens, Cambridge, for *Rosa* × *cantabrigiensis* exhibited on June 2, 1931, which was judged to be the best new hardy plant of garden origin shown to the Society in the course of the year.

35. **The Loder Rhododendron Cup.**—The Loder Rhododendron Cup has been awarded to Captain F. Kingdon Ward for his introduction of new species of Rhododendrons.

36. **The George Moore Medal.**—The George Moore Medal has been awarded to Messrs. Sanders for *Cypripedium Delenatii* exhibited on March 10, 1931, which was considered the best new Cypripedium shown to the Society in the course of the year.

37. **The Sander Medal.**—The Sander Medal has been awarded to Baron Bruno Schröder for *Sophrolaeliocattleya* × *Shillhana* exhibited on December 15, 1931, which was considered to be the best new greenhouse plant shown to the Society in the course of the year.

38. **The Williams Memorial Medals.**—The Williams Memorial Medals for the best groups of plants and/or cut blooms of one genus (fruit and vegetables excepted) which show excellence in cultivation exhibited during the year, has been awarded to Mr. R. Paterson for his group of Miltonias exhibited on June 30, 1931, and to Messrs. Dobbie & Co., Ltd., for their group of Dahlias exhibited on September 23, 1931.

39. **Gifts to the Society.**—The Council desires to record its grateful thanks to the Duke of Buccleuch for a fine engraving of the Fifth Duke of Buccleuch, who was President of the Society from 1862–73; to Mr. C. G. A. Nix, V.M.H., for Sir W. J. Hooker's own copy of his work "British Jungermanniae" and 6 volumes of W. P. Schimper's "Bryologia Europaea"; to Mr. Joseph Benbow for de Candolle's "Plantarum succulentarum Historia"; to Mr. A. D. Slavin for a collection of over 300 photographs of Conifers growing in Rochester Park, New York; to Captain R. H. Grey for his donation to the Society; to Mr. J. B.

Stevenson for many thousands of seedling Rhododendron plants for distribution; to other Fellows at home and abroad for their gifts of seeds, plants and books; and to the publishers for books presented to the library.

40. **Retiring Members of Council.**—The Council desires to express the Society's appreciation of and warmest thanks for the very valuable services rendered during their period of office by its retiring colleagues and to offer its best thanks to Mr. C. T. Musgrave, V.M.G., Vice-Chairman of the Council, Mr. R. D. Trotter, Treasurer for the past three years, and to Mr. L. G. Sutton.

It is very gratifying to know that they will continue to act on the many committees of which they are members.

41. **Technical Adviser and Keeper of the Library.**—On October 1, Mr. F. J. Chittenden, F.L.S., V.M.H., took up his post in London as Technical Adviser and Keeper of the Library. He will also be responsible for the Society's publications.

Fellows are asked to address all requests for advice and questions concerning the naming of plants direct to the London office of the Society.

42. **Fellows' Tickets.**—The Council desires to draw the special attention of Fellows to the notice that is now printed on the annual tickets, namely:—

> "The Fellows are particularly requested to observe the rules of the Society governing the use of personal passes and transferable tickets.
>
> "The personal passes should only be used by the Fellows themselves.
>
> "A transferable ticket must be retained by the person to whom it has been lent during his or her visit to the particular show.
>
> "All personal passes and transferable tickets must be produced to the Society's officers on demand";

and it hopes that these regulations will not be overlooked.

43. **The Press.**—The Council wishes once again to thank the Press for its continued support and goodwill and for its interest in the affairs of the Society.

44. **Committees and Judges.**—Cordial thanks are likewise due to the members of Committees and to the judges, who, by giving up their time so generously, materially assist the work of the Society.

45. **Staff.**—The Council desires to take this opportunity to thank, on behalf of the Society, the Secretary and the administrative staff, both at Vincent Square and at Wisley, for their loyal and diligent work.

Signed on behalf of the Council,
HENRY McLAREN,
President.

December 31, 1931.

Dr. **REVENUE & EXPENDITURE ACCOUNT**

	£ s. d.	£ s. d.
To Establishment Expenses—London.		
Rent, Rates, and Taxes	2,995 9 4	
Salaries and Wages	6,927 10 2	
Other Establishment Expenses, including Light, Fuel, Stationery, Professional Fees, Repairs, Renewals and Interest	4,300 13 10	
		14,223 13 4
,, Wisley—		
Net expenditure for Year, as per Separate Account		11,966 15 2
,, Printing and Postage of Journal and other Publications	3,775 19 5	
Less Sales and Advertisements	1,535 13 1	
		2,240 6 4
,, Staff Pensions	832 16 0	
Less contributed by Staff, as per scheme	338 8 0	
		494 8 0
,, Meetings—		
Expenses and Labour of Special and Other Meetings	4,278 2 9	
Less Takings	493 12 0	
	3,784 10 9	
Spring Meeting:		
Expenses & Labour £6,679 17 7		
Sums allocated for Overhead Expenses 500 0 0		
	7,179 17 7	
Less Takings 5,882 8 7		
	1,297 9 0	
		5,081 19 9
,, Inspection of Gardens—		
Expenditure *less* Receipts		7 12 6
,, Cups and Medals		349 10 3
,, Contribution to Lindley Library—		
Purchase of Books	513 8 6	
Expenses as per Trust Account	287 3 10	
		800 12 4
,, Special Expenditure—		
Clarence Elliott Expedition	50 0 0	
Dr. Noel Humphreys Expedition	10 0 0	
Donation Royal Geographical Society	10 0 0	
,, British Colour Council	5 5 0	
,, Roads Beautifying Association	50 0 0	
,, British Association	105 0 0	
,, London Children's Gardens	10 10 0	
,, John Innes Horticultural Institution	10 10 0	
,, Anti-Grey Squirrel Campaign	2 2 0	
,, Gardeners' Royal Benevolent Inst.	52 10 0	
,, Royal Gardeners' Orphan Fund	21 0 0	
Pritzel Revision (Index Londinensis)	643 2 10	
Herbarium	19 12 6	
Conifer Conference	263 9 11	
Hanbury Memorial	140 0 0	
R.H.S. Foundation Plaque, Hatchard's	110 0 0	
International Horticultural Congress, 1930 Balance	30 11 1	
		1,533 13 4
Botanical Magazine		336 18 11
Scholarships:—		
R.H.S. Working Scholarships	339 10 0	
Less Contribution by Worshipful Company of Gardeners	50 0 0	
		289 10 0
Examinations in Horticulture—		
Expenses	394 0 7	
Less Fees	335 16 6	
		58 4 1
Depreciation, Furniture, and Appliances		1,750 0 0
Old and New Halls Sinking Fund		1,599 10 1
Restaurants—		
Proportion of Overhead Expenses	810 15 10	
Deficit	281 13 10	
		1,092 9 8
Balance being Excess of Revenue over Expenditure carried to General Reserve Account		9,403 5 11
		£51,228 9 8

FOR YEAR ENDED 31st DECEMBER, 1931. **Cr.**

	£ s. d.	£ s. d.
By Annual Subscriptions		43,869 10 7
,, Entrance Fees		558 12 0
,, Donations		5 5 0
,, Dividends and Interest	496 14 0	
,, Do. Do. Davis Trust . .	51 8 10	
		548 2 10
,, Hall Lettings Gross		5,689 6 3
,, Life Compositions—		
Being amount paid by Fellows, who died during the year.		288 5 0
,, Rent of Freehold Property (Wisley) . .		269 8 0

Dr. **ROYAL HORTICULTURAL SOCIETY—**

LIABILITIES.

	£ s. d.	£ s. d.
To Capital Funds Account, 31st December, 1930	38,947 4 2	
Add General Reserve Account transferred	192,907 10 0	
		231,854 14 2
,, Life Compositions, 31st December, 1930	13,675 15 0	
Less Fees paid by Fellows who have died during the year	288 5 0	
	13,387 10 0	
Add Life Compositions paid during year	388 10 0	
		13,776 0 0
,, Sundry Creditors—		
On Open Accounts	3,566 18 0	
Westminster Bank	10,142 0 1	
		13,708 18 1
,, Cash awaiting Investments in Depreciation Funds		1,733 10 2
,, Subscriptions Paid in Advance		405 16 6
,, Depreciation and Renewals Fund—		
31st December, 1930	6,261 0 9	
Add Unexpended balance of Investments realized for Renewals, 1930	149 10 2	
	6,410 10 11	
Less Renewals, 1931	416 0 0	
	5,994 10 11	
Added to Fund, 1931	1,750 0 0	
		7,744 10 11
,, Old and New Halls Sinking Fund		3,172 0 11
,, Weather Insurance Fund		3,000 0 0
,, Supplementary Pension Fund		1,284 10 10
,, Memorial and Other Trust Funds—		
Balances in hands of Society as per separate Schedule		383 13 11
,, General Reserve Account 31st December, 1930	186,053 16 11	
Less Renewals transferred from Capital Expenditure as per contra	2,549 12 10	
	183,504 4 1	
Add Balance as per Annual Revenue and Expenditure Account, 1931	9,403 5 11	
Transferred to Capital Funds Account	192,907 10 0	
		£277,063 15 6

BALANCE SHEET, 31st DECEMBER, 1931. Cr.

ASSETS.

	£ s. d.	£ s. d.	£ s. d.
By CAPITAL EXPENDITURE—			
Old Hall, Offices, Restaurant, Library and Equipment, 31st Dec., 1930 . .	77,504 11 5		
Net Additions during 1931 .	2,617 0 5		
	80,121 11 10		
Less Renewals Transferred to General Reserve Account as per contra . . .	2,549 12 10		
		77,571 19 0	
New Hall, Restaurant and Equipment, 31st Dec., 1930	166,919 16 6		
Additions during 1931 . .	735 11 4		
		167,655 7 10	
			245,227 6 10
,, FREEHOLD PROPERTY, WISLEY—			
31st December, 1930		13,158 13 9	
Less Sale of Land		70 10 10	
			13,088 2 11
,, BOTANICAL MAGAZINE—			
Stock		100 0 0	
Work in advance		489 8 7	
			589 8 7
,, DEPRECIATION AND RENEWALS FUND INVESTMENTS AT COST		6,261 0 9	
(Market value of Investments at 31st December, 1931, £6,050 5s. 4d.)			
Add Cash awaiting Investment . . .		1,483 10 2	
			7,744 10 11
,, OLD AND NEW HALLS SINKING FUND INVESTMENTS AT COST		1,460 11 11	
Add Investments during the year . .		1,711 9 0	
			3,172 0 11
(Market value of Investments at 31st December, 1931, £2,962 17s. 6d.)			
,, WEATHER INSURANCE FUND INVESTMENTS AT COST			3,000 0 0
(Market value of Investments at 31st December, 1931, £2,896 6s. 6d.)			
,, SUPPLEMENTARY PENSION FUND INVESTMENTS AT COST		986 15 8	
Add Investments during the year . .		297 15 2	
			1,284 10 10
(Market value of Investments at 31st December, 1931, £1,220 1s. 6d.)			
,, SUNDRY DEBTORS AND PAYMENTS IN ADVANCE .			2,112 17 7
,, CASH AT BANK AND IN HAND			844 16 11
			£277,063 15 6

I have audited the books from which the foregoing Accounts are compiled, and certify that they exhibit a true and correct statement of the position of the Society on the 31st December, 1931. In the total of Assets £277,063 15s. 6d., are included Investments and Cash amounting to a total sum of £15,584 16s. 7d., representing depreciation and other funds which are not available for the general purposes of the Society.

J. S. FEATHER, F.C.A., *Auditor*
(HARPER, FEATHER & PATERSON, *Chartered Accountants*),
35 Great Tower Street, London, E.C. 3.

5th January, 1932.

Dr. **WISLEY GARDENS—REVENUE & EXPENDITURE**

	£	s.	d.	£	s.	d.
To ESTABLISHMENT EXPENSES—						
Salaries and Wages	2,123	16	8			
Rates, Taxes and Insurance	355	7	1			
Miscellaneous, including Donations	813	0	9			
				3,292	4	6
,, LABORATORY AND SCHOOL OF HORTICULTURE—						
Salaries and Wages	2,417	16	4			
Miscellaneous	115	19	2			
Depreciation	90	0	8			
				2,623	16	2
,, GARDEN—						
Salaries and Wages	6,924	6	6			
Plant Distribution	936	5	6			
Miscellaneous	1,226	4	11			
Depreciation	558	9	0			
				9,645	5	11
,, STAFF PENSIONS	595	3	7			
Less contributed by Staff	297	12	0			
				297	11	7
				£15,858	18	2

ACCOUNT FOR YEAR ENDED 31st DECEMBER, 1931. Cr.

	£ s. d.	£ s. d.
By DIVIDENDS AND INTEREST		1,406 15 6
,, MINISTRY OF AGRICULTURE GRANT . . .		1,037 1 4
,, LABORATORY AND SCHOOL OF HORTICULTURE— Analysis Fees		20 0 0
,, GARDEN— Sales and Miscellaneous Receipts . . .	571 13 7	
Prepaid Distribution Postages and Packing Fees	856 12 7	
		1,428 6 2
,, BALANCE, being Net Expenditure for year, carried to the Annual Revenue and Expenditure Account		11,966 15 2
		£15,858 18 2

Dr. **WISLEY GARDENS—BALANCE**

LIABILITIES.

	£	s.	d.	£	s.	d.
To CAPITAL FUNDS ACCOUNT—						
31st December, 1930	36,878	12	7			
Less Decrease	243	3	9			
				36,635	8	10
,, ENDOWMENT TRUST FUND				23,342	7	11
(The difference between this Fund and the Investment Account on the Assets side is due to a change in the Investments which was made in 1921 and to the writing off of the City of Moscow 4½% 1912 Loan)						
,, DEPRECIATION AND RENEWALS FUND—						
As at 31st December, 1930	6,111	19	3			
Added to Fund, 1931	250	0	0			
				6,361	19	3

£66,339 16 0

ASSETS.

	£ s. d.	£ s. d.
By CAPITAL EXPENDITURE—		
Laboratory, Dwelling Houses, Glass Houses, Ranges, etc.—As at 31st December, 1930		33,371 10 10
N.B.—The Hanbury Trust Estate is, under the Trust Deed, vested in the Society only so long as it is in a position to use it as an Experimental Garden. Accordingly the Expenditure thereon by the Society is an Asset only so long as the Gardens continue to be used by the Society.		
,, FUEL STOCK		200 0 0
,, MOTOR CAR AND LORRY—		
As at 31st December, 1930		5 0 0
,, PLANT, LIVE STOCK, AND LOOSE EFFECTS, as valued by the Director—		
As at 31st December, 1930	3,210 8 5	
Add Purchased during the Year	139 15 4	
	3,350 3 9	
Less Depreciation	398 9 8	
	2,951 14 1	
Add Appreciation of Live Stock	87 19 5	
		3,039 13 6
LIBRARY, as at 31st December, 1930	470 6 0	
Additions during the year	27 11 2	
		497 17 2
ENDOWMENT TRUST FUND INVESTMENTS	22,963 15 3	
Less City of Moscow 4½% 1912 Loan at Book Value	100 0 0	
		22,863 15 3
(Market value of Investments at 31st Dec., 1931, £19 548 13s. 8d.)		
DEPRECIATION AND RENEWALS FUND INVESTMENTS AT COST	6,111 19 3	
(Market value of Investments at 31st Dec., 1931, £6,545 7s. 7d.)		
Add Cash awaiting Investment	250 0 0	
		6,361 19 3
		£66,339 16 0

I have audited the books from which the foregoing Accounts are compiled, and certify that they exhibit a true and correct statement of the position on the 31st December, 1931. In the total of Assets £66,339 16s. 0d. are included Investments and Cash amounting to a total sum of £29,225 14s. 6d. representing Endowment and Depreciation Funds which are not available for the general purposes of the Society.

J. S. FEATHER, F.C.A., *Auditor*
(HARPER, FEATHER & PATERSON, *Chartered Accountants*),
35 Great Tower Street, London, E.C. 3.

5th January, 1932.

		Amount of Fund represented by Investments at Cost.			Income Balance in hand 31st Dec. 1930.		
		£	s.	d.	£	s.	d.
1.	Alfred Davis Trust Fund . . .	946	0	3	*nil*		
2.	Williams Memorial Fund . . .	245	11	9	12	12	4
3.	Masters Memorial Fund . . .	542	17	0	147	19	5
4.	Nicholson Memorial Fund . . .	180	14	4	*nil*		
5.	Schröder Pension Fund	557	14	6	6	6	8
6.	Lindley Library Trust	11,453	10	9 (*a*)	*nil*		
7.	Sir James Knott Trust	600	0	0	34	10	0
8.	Veitch Memorial Trust Fund . .	1,673	19	1	157	12	3
9.	Moore Medal Trust Fund . . .	190	10	6	14	18	7
10.	Sewell Medal Trust Fund . . .	500	0	0	*nil*		
11.	Mrs. A. Sherman Hoyt Prize Fund .	207	7	10	9	15	1
12.	Lord Riddell Trophy Fund . . .	175	0	0	*nil*		

Notes on above Funds:

1. Bequeathed to the Society in 1870 for Annual prizes or any other object the Council may determine.

2. Raised by donations in 1891 in memory of the late Mr. B. S. Williams towards the provision of prizes and medals.

3. Raised by donations in 1908 in memory of the late Dr. Masters towards the provision of one or more annual lectures.

4. Raised by donations in 1908 in memory of the late Mr. Geo. Nicholson to provide prizes for Wisley Students.

5. Provided by the Society in memory of the late Baron Schröder to pay to the Gardeners' Royal Benevolent Institution for one pension.

6. The nucleus of the Library is the fine collection of books and pamphlets which belonged to the late Dr. Lindley. It has since been added to by the books purchased by the Society, and by the gifts of private donors.

FUND ACCOUNTS, 31st DECEMBER, 1931.

Dividends and Interest received during 1931.	Expenditure in 1931 in accordance with the Trust.	Income Balance in hand of R.H.S. 31st Dec., 1931.
£ s. d.	£ s. d.	£ s. d.
51 8 10	51 8 10	*nil*
9 17 5	8 8 0	14 1 9
20 0 0	33 8 7	134 10 10
7 8 6	7 8 6	*nil*
20 0 0	20 0 0	6 6 8
332 13 4 (*b*)	332 13 4	*nil*
30 0 0	22 10 0	42 0 0
83 13 11	83 13 0	157 13 2
9 6 10	7 9 6	16 15 11
24 12 7	24 12 7	*nil*
10 8 0	7 17 6	12 5 7
5 14 6	5 14 6	*nil*
Total as per Balance Sheet .		£383 13 11

	£ s. d.
(*a*) Investment .	1,458 15 7
Cost of Books purchased by the Society up to 31st Dec., 1930 . .	9,481 6 8
Books purchased by the Society in 1931 . .	513 8 6
	£11,453 10 9

(*b*) Includes contribution by R.H.S. in 1931, £287 3*s.* 10*d.*

7. Presented to the Society in 1920 for the purpose of providing a scholarship tenable at Wisley.

8. Instituted in 1870 in commemoration of the late Mr. James Veitch for the encouragement of Horticulture. Fund vested in the Society in 1922.

9. Presented to the Society in 1926 by the late Mr. G. F. Moore to provide a medal annually for the best new Cypripedium shown to the Society during the year.

10. Presented to the Society in 1928 by Mr. A. J. Sewell to provide medals for Rock Garden Plants.

11. Presented by Mrs. A. Sherman Hoyt as a donation and funded by the Society to provide prizes for the encouragement of the growth of Cacti and Succulents.

12. Presented by Lord Riddell to provide a trophy annually to be awarded for vegetables.

SCIENTIFIC COMMITTEE.

August 11, 1931, Sir DAVID PRAIN, F.R.S., V.M.H., in the Chair, and six other members present.

Smyrnium Olusatrum.—Mr. J. Fraser reported that the umbellifer he had taken at the last meeting proved to be *S. Olusatrum.*

Fascicled Inflorescence.—Fascicled inflorescence of *Rosa Willmottiae* was shown by Miss Willmott from Warley, the plant bearing only one such inflorescence and being normal in all other respects.

Tragopogon minor aberrant.—Mr. Fraser showed capitula of *Tragopogon minor* with stalked flowers as is sometimes seen in Helenium.

Supposed cross between Melon and Cucumber.—A supposed cross between a Melon and Cucumber breeding true to the third generation was sent by Mr. S. G. Brown of Shepperton. The fruit was oval, rather corrugated longitudinally and had flesh of the melon type. Forms similar in every way except for slight differences in colour were figured in old books.

Various plants.—The Watsonia shown as *W. Galpinii* at the last meeting was reported by Mr. Cotton to be *W. angusta*, and the Gladioli shown respectively as *G. Quartinianus* and *G. tristis*, to be in all probability *G. dracocephalus* and *G. Eckloni*. Mr. E. G. Baker showed dried specimens of plants from the Tianshan Mountains, viz. *Lathyrus luteus, Thermopsis lanceolatus, Lathyrus altaicus, Hedysarum Seminowi*, and *Caragana aurantiaca*, several of which appeared to be plants worthy of a place in gardens.

Rose Plantago media.—Mr. Loder showed an example of the form of *Plantago media* in which the bracts are enlarged and aggregated at the top of the scape. This form does not produce seeds.

August 25, 1931, Sir DAVID PRAIN, F.R.S., V.M.H., in the Chair, and eight other members present.

Various plants.—Mr. Baker reported that the Oxalis with reddish flowers so commonly found in British gardens and a pernicious weed, appeared to be *O. rubra*; the other plant, which he had taken last week, to be *Carissa edulis*.

Globba aurantiaca.—Mr. Hales showed an inflorescence of *Globba aurantiaca* with many bulbils in the basal part.

Virescent Helenium.—Mr. Treseder of Cardiff sent a virescent Helenium of the ordinary type and Mr. Fraser brought one (a specimen from one of the several clumps similarly affected) with an elongated inflorescence with repeated bracts. He had found Thrips among the flowers as well as mites and thought the malformation might be due to their presence.

Twin Apple.—He also showed a very complete twin Keswick Codlin with a single stalk and two calyces.

Echium vulgare, pink.—Mr. Fraser showed a pink-flowered *Echium vulgare* from chalk pits near Merstham, where it was growing with other colour varieties.

September 8, 1931, Sir DAVID PRAIN, F.R.S., V.M.H., in the Chair, and seven other members present.

Galls on birch.—Mr. J. Fraser showed galls (witches' brooms) on *Betula pubescens* caused by the mite *Eriophyes rudis*.

Annual rings of wood in trees.—Mr. Worsley referred to work being carried out in America under the Carnegie Trust to elucidate the problem whether more than one annual ring is produced by a tree in certain circumstances.

Twin Tomatos.—Mr. Fraser showed twin tomatos joined only by the calyces.

Chimera.—He also showed a spike of a Gladiolus bearing two completely purple flowers, one bluish white and purple, the remaining flowers blush white.

Foliaceous sepals.—Mr. Fraser also showed a rose with the sepals greatly enlarged and pinnate.

Fasciated broom.—Mr. Hales showed a fasciated branch of the common broom, *Cytisus scoparius*.

September 23, 1931, Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and five other members present.

Change of shade in Roses.—Mr. Hancock sent a sport of Rose 'Queen Alexandra' which in the early part of the season produces yellow flowers, later flowers flushed crimson, and later still yellow again. It was pointed out that many roses commonly behaved in this way.

Linnaea borealis.—Mr. Fraser showed the European and American forms of *Linnaea borealis*, pointing out that the latter is larger in all its parts. It had been distinguished under the name of *L. borealis* var. *americana*.

Rosa gigantea fruiting.—Mr. Courtney Page showed fruit of *Rosa gigantea* produced at Haywards Heath. This rose appears to have flowered at several places in the open this year.

Weeds and Soils.—Dr. Voelcker drew attention to the copious growth of the common mayweed on the plots at the Woburn experiment farm which has been limed after forty years' dressing with sulphate of ammonia. The parts of these plots which had not been limed were free from this weed.

September 30, 1931, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and eight other members present.

British plants.—Mr. J. Fraser showed dried specimens of *Sium latifolium* to show the remarkable degree of variation in the foliage, not only between the leaves growing submerged but also in the leaves of the aerial parts in the same and in different specimens. *Sium erectum*, which he also showed, exhibited much less variation.

Mr. Fraser also showed *Gentiana Pneumonanthe* from various localities, and Mr. Bowles remarked upon the sudden appearance of this plant on a gravelly ploughed field (which had been allowed to run wild) within a year or two of its abandonment. He thought this an illustration of the probability of seeds lying long dormant in the soil and many other instances were quoted in support of this idea.

Chinese plants.—Mr. Musgrave sent a *Swertia* raised from seed collected by Mr. Forrest in Yunnan. The plant, which was apparently an annual, appeared to be near *S. purpurascens* described from the N.W. Himalaya, and Mr. Cotton took it for further examination. Mr. Musgrave also showed *Gentiana rigescens* with the same origin.

Fruit of Peach.—Mr. Bowles showed fruits of a peach with perfectly free stones grown at Myddelton House, probably from China, but possibly from Persia. The fruits were about an inch in diameter and had thin soft flesh.

Pear proliferous.—He also showed a pear with axial proliferation.

Buddleia Davidi magnifica × *B. globosa*.—Mr. Van der Weyer sent a branch of a cross between *B. globosa* and *B. Davidi magnifica*, with large globular inflorescences of dull purplish flowers.

November 3, 1931, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and seven other members present.

Oxalis sp.—Mr. Baker reported that the plant recently shown (see Minute, Aug. 25) and thought to be *Oxalis rubra* had been referred to France and there declared not to be that species. The French authorities thought it might be *O. Martiana*.

Burttia prunoides.—He also drew attention to a shrub from Tanganyika which at first was thought to be a species of *Conara*, but which had now been described in the *Journal of Botany* as *Burttia prunoides*.

Fasciated Chrysanthemum uliginosum.—Mr. Fraser showed a fasciated plant of *Chrysanthemum uliginosum* with the two heads joined.

Hybrid Hippeastrums.—Mr. Worsley drew attention to a confusion in nomenclature which had arisen through the use of somewhat similar names for two distinct hybrid Hippeastrums sent out by Garraway of Bristol and probably raised by him. They were *H.* × *Acramanii* (*H. aulicum* × *H. psittacinum*) raised in 1835 and *H.* × *Ackermannii pulcherimimum* (*H. aulicum* × *H. Johnsonii*) raised in 1850.

Hollyhock Rust.—Mr. Tincker drew attention to an idea that seedling Hollyhocks do not suffer from rust, and it was pointed out that this idea is quite erroneous. It has this amount of truth in it, that the attack is often less severe than on older plants, since opportunity for attack may have been less.

Split root of Kohl-rabi.—Mr. Bowles showed a root of Kohl-rabi which had split in a curious starfish fashion, and it was taken by Mr. Tincker for further examination.

November 24, 1931, Mr. F. J. Hanbury, F.L.S., V.M.H., in the Chair, and seven other members present.

Split root of Kohl-rabi.—Mr. Tincker reported that the split root of Kohl-rabi shown at the last meeting had apparently split early in its development, and each part had thickened about equally, showing by the leaf scars that each had developed spirally.

Viviparous Freesia.—Mr. Van de Weyer sent an inflorescence of a seedling Freesia with a corm and green leaves developing in place of a flower.

Oenanthe sp.—Mr. Fraser showed a series of dried specimens of British species of *Oenanthe* illustrating the heterophylly that occurs in some of them, and commented upon the differences in the aquatic and semi-aquatic forms which he had found. Mr. Hanbury remarked upon the different forms of tubers found in different species.

Hybrid Oak.—Mr. E. G. Baker showed a shoot from an oak in Mr. G. W. E. Loder's garden, with characters intermedia between *Quercus pedunculata* and *Q. sessiliflora*—the *Q.* × *intersessiliflora* of the *Journal of Botany* t. 502.

Cuscuta reflexa.—Mr. W. Hales showed flowering plants of *Cuscuta reflexa* growing on *Jacobinia chrysostephani.*

December 15, 1931, Sir DAVID PRAIN, F.R.S., V.M.H., in the Chair, and five other members present.

Juncus bulbosus f. fluitans.—Mr. J. Fraser showed specimens of this curious form of *Juncus bulbosus* which came before the Committee about a year ago, and which he had now collected in the Black Pond at Esher. He also showed somewhat similar growths of *Scirpus fluitans* from the same locality.

Lupinus growth.—Mr. Fraser also showed a piece of a perennial Lupin with normal large foliage at the base passing into small foliage higher up. Mr. Chittenden pointed out that this often occurred in the hybrid Lupins which are so frequently grown now, looking as though the form of *Lupinus arboreus* were breaking out in the upper part of the plant.

January 12, 1932, Sir DAVID PRAIN, F.R.S., V M.H., in the Chair, and eleven other members present, with Mr. A. LOFTHOUSE (visitor).

British Koelerias.—Mr. J. Fraser showed a series of dried specimens of British species and varieties of Koeleria collected mainly on the Hog's Back, Surrey. The series included *Koeleria gracilis* var. *britannica*, and the forms which Mr. Fraser distinguished as *f. glabrescens*, *f. glabrispiculis*, and *f. praelongis.*

Sudden death of Ampelopsis inconstans.—Professor Armstrong drew attention to the sudden death of large portions of a plant of *Ampelopsis inconstans* growing on his house, the first time twenty years ago, the second in 1931—in very different seasons. It was thought that the death may have followed cracking of the stem from some cause.

Isolation of Vitamins.—Professor Armstrong also drew attention to the isolation of Vitamin A related to Carotin (a compound containing 24 atoms of carbon, the vitamin containing 20). This is the second vitamin to be isolated and crystallized.

Spanish flora.—Mr. Lofthouse showed a long series of dried specimens, which he had collected in Granada, of mountain plants, several of which are not yet in cultivation. The specimens were beautifully preserved and formed a very interesting series.

January 26, 1932, Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and ten other members present.

Pansies to withstand hot weather.—Mr. Cuthbertson drew attention to a communication from America requesting information as to species or varieties of Viola capable of withstanding hot and dry summer conditions. Of the European species *V. cornuta* was thought to be the species most likely to prove useful.

Monograph of Sidalcea.—Mr. Baker drew attention to a recent Monograph of Sidalcea which he considered of great value for the naming of species of this genus.

Ferns native in Surrey.—Mr. Fraser showed a long series of dried ferns collected in Surrey where, except bracken, ferns are not very abundant. The specimens included *Asplenium Adiantum-nigrum*, *Lastrea montana*, *L. Filix-Mas*, and its variety *affinis*, *L. spinulosa*, *L. aristata* (= *L. dilatata*) and a very long-fronded form of *Polypodium vulgare.*

Lily Conference.—Messrs. Chittenden, Cotton, and Tincker were nominated to make suggestions for papers at the Lily Conference of 1933.

Crocus seedlings.—Mr. Bowles showed four seedlings of Crocuses, two of *C. Tomasinianus*—one rose-pink, the other with some characters of the var. *pictus*, almost red, two of *C. chrysanthus*, one called 'Copenhagen China' with a greyish-white coloration, the other with the outer segments almost blue without, probably a form crossed with *C. biflorus Weldenii.*

February 9, 1932, Sir DAVID PRAIN, F.R.S., V.M.H., in the Chair, and eight other members present.

Variation in Narcissus Johnstonii.—Mr. Bowles drew attention to a plant collected in Spain and shown by Messrs. Barr, having a pale perianth instead of one of approximately the same tint as the corona.

Plants and manures.—Dr. Voelcker reported an investigation of failure in Hippeastrum growing accompanied by the presence of a white encrustation upon the soil. He found this encrustation consisted largely of nitrate of soda and considered the failure to be probably due to excessive use of nitrate of soda and perhaps some tar product used in an attempt to kill soil pests. He also directed attention to damage and death of gooseberry bushes following the use of kainit, and said that it appeared the manure had been used at the rate of 6 tons to the acre and that its effect had been to deflocculate the clay and cause the soil to "run."

Tulips with more flowers than normal.—Mr. Hales reported that many of the Duc van Thol Tulips grown by him at Chelsea this year had produced axillary flowers, and some had been fasciated. It seemed possible that a longer growing season than normal may have brought about these phenomena.

Deposits on leaves.—Mr. Hales also showed laurel leaves bearing a deposit of soot which was difficult to remove and expressed the opinion that though the deposit may be no denser than it was years ago, yet it appeared to cling more tightly and was consequently very difficult to remove.

Heterophylly in seedling ferns.—Mr. Tincker showed a series of seedling ferns of the following species:

Pellaea dura	*P. viridis*	*Osmunda regalis*
P. pteroides	*P. Doniana*	*Gleichenia polypodioides*
P. hastata	*Gymnogramme caudiformis*	

to illustrate the differences between the juvenile and the adult leaves, and the gradations that occur from infancy to adolescence.

Wheat-ear Carnation.—Mr. Fraser showed a series of flowers from one plant of Carnation, exhibiting various stages between normal and full wheat-ear condition. The flowers were single.

British ferns.—Mr. Fraser also showed a series of dried ferns to complete the list of those now found in Surrey, including *Pteris Aquilina, Asplenium Ruta-muraria, Athyrium Filix-foemina, Blechnum Spicant* and its extremely robust form—*giganteum*—from Tilgate Forest, *Polystichum aculeatum* (uncommon in Surrey), and *Ophioglossum vulgare.*

February 23, 1932, Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and five other members present.

Species of Ornithogalum.—Mr. Fraser showed dried specimens of the two species of *Ornithogalum* naturalized in Great Britain, *O. umbellatum* and *O. pyrenaicum.*

FRUIT AND VEGETABLE COMMITTEE.

August 11, 1931, Mr. E. A. Bunyard, F.L.S., in the Chair, and nine other members present.

Award Recommended :—

Cultural Commendation.

To Mr. F. Streeter, gardener to Lord Leconfield, Petworth Park, for Peaches, Nectarines, and Apricots.

Other Exhibits.

To Messrs. Geo. Bunyard, Maidstone : Figs and Crabs.

To Messrs. S. Spooner, Hounslow : Apples and Berries.

To Mr. K. Ward, West Kirby : seedling Peach.

To Mr. A. J. Brummitt, Banbury : seedling Raspberry.

To Mr. S. G. Brown, Shepperton : 'Cu-Con' (Cucumber × Melon).

The awards recommended by the Sub-committee visiting Wisley to judge the trial of Tomatos were confirmed.

August 25, 1931, Mr. E. A. Bunyard, F.L.S., in the Chair, and thirteen other members present.

Award Recommended :—

Silver Hogg Medal.

Mr. F. Streeter, Petworth Park Gardens : Grapes, Melons, and 'Maynard' Plum.

Other Exhibits.

Mr. E. A. Bunyard, Allington : fruits of 'Flat China' Peach.

The following awards to Maincrop Culinary Peas grown at Wisley were confirmed :

Award of Merit.

Phenomenon from Messrs. Johnson and Hurst ; *Duplex* from Messrs. Hurst, Johnson, Clucas, Harrison, Dobbie, Ferry-Morse, and Zwaan & de Wiljes ; *Onward* from Messrs. Watkins & Simpson, Hurst, Nutting, Clucas, Harrison, Kelway, and Benary ; *Morse's Market* from Messrs. Ferry-Morse ; *Gladstone* (syn. 'Freedom') from Messrs. Dobbie, Morris, Simpson, Stuart & Mein, Webb, and Hurst ; *Senator* from Messrs. Speed, Johnson, Yates, Benary, and Hurst ; *Union Jack* from Messrs. Morris, Harrison, Speed, Simpson, Apps, and Hurst ; *Chancelot* from Messrs. Johnson, Simpson, Dobbie, and Hurst ; *Renown* from Messrs. Hurst ; *Director* from Mr. Holmes ; *Telegraph* from Messrs. Hurst ; *Admiral Beatty* from Messrs. Hurst, Morris, Kelway, Johnson, Simpson, Zwaan & de Wiljes, Dobbie, and Harrison ; *King of Peas* from Messrs. Dickson & Robinson ; *Alderman* from Messrs. Hurst, Harrison, Zwaan & de Wiljes, and Nutting ; *Prince Edward Improved* from Messrs. Hurst ; and, as canning peas, *Lincoln* from Messrs. Hurst, Speed, and Apps ; *Histon Bountiful* from Messrs. Unwin ; *Advancer* from Messrs. Hurst.

Highly Commended.

Supreme from Messrs. Hurst, Harrison, and Zwaan & de Wiljes ; *Little Wonder* from Messrs. Unwin ; *Prizewinner* from Messrs. Hurst ; *Stratagem* (syn. 'Rent-payer') from Messrs. Hurst, Ferry-Morse, Speed, Morris, and Zwaan & de Wiljes ; *James Kelway* from Messrs. Kelway ; *Early President, Brunswick, President, Alliance,* and *Major Kingston,* all from Messrs. Hurst ; *Balnagown Castle* from Mr. Holmes ; and, as a canning pea, *Hamlet* from Messrs. Hurst.

Commended.

Giant Stride from Messrs. Hurst.

September 8, 1931, Mr. E. A. Bunyard, F.L.S., in the Chair, and eleven other members present.

Exhibits.

Mr. B. J. Waugh, Gosforth : seedling Peach.

Mr. C. J. Soltan, Slough : seedling Plum.

Mr. W. H. Divers, Surbiton : transparent Crab.

September 23, 1931, Mr. E. A. Bunyard, F.L.S., in the Chair, and thirteen other members present.

Award Recommended :—

Award of Merit.

To Apple 'Epicure,' exhibited by Messrs. Laxton, Bedford. A dessert apple raised by crossing 'Wealthy' and 'Cox's Orange Pippin.' This apple is of medium size, evenly rounded, yellow, with red or crimson streaks and flush. The eye is closed, in a shallow and slightly plaited basin ; the stalk is long, set in wide and moderately deep, even cavity ; flesh is creamy-white, rather soft and juicy, and well flavoured. The season is from the end of September to the middle

of October. This variety is growing in the Commercial Fruit Trials at Wisley, and a full report upon habit of growth, fertility, and other characters will be published in due course.

Other Exhibits.

Mr. J. Hardy, Lymington : Apple ' Harvey's Seedling.'
Mr. Tomalin, Stanstead Park Gardens : Apple ' Pêche Melba.'
Mr. E. A. Bunyard, Allington : Pear ' Knight's Monarch.'

September 30, 1931, Mr. E. A. Bunyard, F.L.S., in the Chair, and fifteen other members present.

Exhibits.

Mr. W. D. Vizard, Gloucester : seedling Apple.
Miss F. M. Durham, Otterton : seedling Apple.

October 6, 1931, Mr. E. A. Bunyard, F.L.S., in the Chair, and twenty-four other members present.

Awards Recommended :—

Gold Medal.

To Reading University for collection of fruit.
To Messrs. Dobbie, Edinburgh, for Potatos.
To Messrs. Sutton, Reading, for vegetables.

Silver-gilt Hogg Medal.

To Messrs. Allgrove, Slough, for collection of fruit.

Silver Hogg Medal.

To Messrs. Laxton, Bedford, for Apples.
To Messrs. Bunyard, Maidstone, for collection of fruit.

Bronze Hogg Medal.

To Messrs. Allgrove, Slough, for fruit trees in pots.
To Messrs. Rivers, Sawbridgeworth, for fruit trees in pots.
To Messrs. Cheal, Crawley, for collection of fruit.
To Messrs. Almond, Effingham, for Grapes.
To the Barnham Nurseries, Barnham, for Apples.

Bronze Knightian Medal.

To Messrs. Dickson & Robinson, Manchester, for Onions.

Other Exhibits.

Messrs. Spooner, Hounslow : collection of fruit.
Messrs. Daniels, Norwich : collection of fruit.
Lt.-Col. Normand, Guildford : Apples in boxes.
Swanley Horticultural College : Apples in boxes.
Mr. G. P. Good, Sidcup : Apple ' Bushey Grove.'
Messrs. Brinkler, Osborne & Young, Surbiton : Potatos.
Mr. W. K. Pain, Datchett : Apple ' John Robinson.'
Mr. E. Hall, Erdington : Apple ' Edward Hall.'
The Marquis of Exeter, Stamford : Melon ' Lord Burghley.'
Leigh-on-Sea Horticultural Society : Carrots for opinion.
Mrs. Walter Rawnsley, O.B.E., Alford : seedling Persimmon.

November 3, 1931, Mr. E. A. BUNYARD, F.L.S., in the Chair, and thirteen other members present.

Award Recommended :—

Gold Medal.

To Messrs. Allgrove, Slough, for Apples.

Other Exhibits.

Mr. H. H. Thorne, Welwyn : Apple ' Santa Rosa.'
Mr. W. J. Haysman, Chipperfield : seedling Apple.
Mr. H. Brewer, Maldon : Apple ' Maldon Wonder.'
Mr. H. Reeves, Henley-on-Thames : seedling Apple.
Miss M. M. Cannell, Loddon : Apples.
Mr. E. A. Bunyard, Allington : specimen Apples.

November 24, 1931, Mr. E. A. BUNYARD, F.L.S., in the Chair, and seventeen other members present.

Exhibits.

Mr. W. H. Divers, Surbiton : Apple ' Barnack Orange.'
Mr. C. Carpenter, Woking : seedling Apple.

December 15, 1931, Mr. E. A. BUNYARD, F.L.S. in the Chair, and fourteen other members present.

Exhibits.

R.H.S. Gardens, Wisley : varieties of Celery from the Wisley Trials.
Messrs. Stuart Low & Co., Enfield : Apple ' Winter Harding.'
Messrs. Dobbie, Edinburgh : Kale.

FLORAL COMMITTEE, Section A.

August 11, 1931, Mr. G. W. LEAK, V.M.H., in the Chair, and seventeen other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Jones, Lewisham, for Phloxes.

Silver Banksian Medal.

To Messrs. Bentall, Havering, for Roses.
To Messrs. Ladhams, Southampton, for herbaceous plants.
To. Mr. A. Miles, Bickley, for Gladioli and herbaceous plants.
To Messrs. Prichard, Christchurch, for herbaceous plants.

Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.
To Mrs. Bertie Bell, Guernsey, for Gerberas.
To Messrs. B. R. Cant, Colchester, for Roses.
To Messrs. Engelmann, Saffron Walden, for Carnations.
To Mr. Hemsley, Crawley, for Sidalceas.
To Mr. A. Perry, Enfield, for herbaceous plants.
To Messrs. Wheatcroft, Gedling, for Roses.

Award of Merit.

To *Rudbeckia hirta*, Hyde Park var., as a hardy border plant (votes 13 for), from T. Hay, Esq., V.M.H., Hyde Park, London. A variety with bronzy-brown flowers tipped with golden-yellow and measuring 3 inches across. It originated from seed of *R. hirta*, a North American species with yellow flowers. It is perfectly hardy and can be propagated by division.

Other Exhibits.

P. Bauchop, Esq., Alexandria, Scotland : Astilbe ' Mrs. Bauchop.'
Messrs. Clark, Dover : herbaceous plants.
T. Hayhurst, Feniscowles : Lobelia.
Messrs. Hayward, Clacton : herbaceous plants.
Misses Hopkins, Coulsdon : herbaceous plants.
Mr. C. T. Kipping, Althorne : Chrysanthemums.
Mr. F. C. Knight, Clacton : Dahlias.
Messrs. Prichard, Christchurch : Phlox ' Entrancing.'
Major S. J. Thompson, D.S.O., Wolverhampton : Begonia ' Mrs. S. J. Thompson.'
Messrs. F. Gomer Waterer's Knaphill Nursery, Woking : Montbretias.

August 25, 1931, Mr. H. B. MAY, V.M.H., in the Chair, and twelve other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Dobbie, Edinburgh, for Gladioli.
To Messrs. Wakeley, London, for Gladioli.

Silver Lindley Medal.

To Mrs. Humbert (gr. Mr. E. Moody), Romsey, for Lobelias.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.
To Messrs. Chaplin, Waltham Cross, for Roses.
To Mr. S. J. Goodliffe, Bishop's Stortford, for herbaceous plants.
To Messrs. Ladhams, Southampton, for herbaceous plants.
To Mr. A. Miles, Bickley, for herbaceous plants.
To Mr. J. B. Riding, Chingford, for Dahlias.
To Messrs. Sale, Wokingham, for Gladioli.
To Messrs. Stredwick, St. Leonards-on-Sea, for Dahlias.

Banksian Medal.

To Messrs. Bentall, Havering, for Roses.
To Messrs. B. R. Cant, Colchester, for Roses.
To Messrs. Cheal, Crawley, for Dahlias.
To Messrs. Engelmann, Saffron Walden, for Carnations.
To Mr. H. Hemsley, Crawley, for Dahlias and Sidalceas.
To Messrs. Langridge, Westerham, for Dahlias and Gladioli.
To Messrs. Carter Page, London, for Dahlias.
To Messrs. Patrick, Seal, for Roses.

To Messrs. Prichard, Christchurch, for herbaceous plants.
To Messrs. Redgrove, Borough Green, for herbaceous plants.
To Messrs. Wheatcroft, Gedling, for Roses.

Award of Merit.

To *Lobelia* ' Jack MacMaster ' as a hardy border plant (votes unanimous), from Mrs. Arthur Humbert, Romsey. This plant, which is reported to be quite hardy, resulted from a cross between *L. fulgens* and *L. syphilitica*. The spikes of dark reddish-purple flowers are about a foot long. The stems are also dark and the leaves are tinged with purple.

The following plant received an award after trial at Wisley :—

Award of Merit.

To Montbretia ' Fiery Cross ' from Messrs. Barr, Taplow. 3¼ feet tall, erect, well branched ; stems strong, stiff. Flowers very freely borne, 2¾ inches diameter, flat, of good substance, orange-red with large pale yellow zone at throat. A strong sturdy grower.

Preliminary Commendation.

To Gladiolus ' Helen Howard ' for show purposes from Major G. Churcher, Lindfield.

Selected for trial at Wisley.

Dianthus Allwoodii alpinus, vars. ' Mist,' ' Oberon,' and ' Charming,' from Messrs. Allwood, Haywards Heath.

The awards recommended to Zonal Pelargoniums and Antirrhinums (p. 124) on trial at Wisley were confirmed.

Other Exhibits.

Messrs. Bunyard, Maidstone : herbaceous plants.
Messrs. Clark, Dover : herbaceous plants.
Messrs. Hayward, Clacton : Dianthus.
Misses Hopkins, Coulsdon : herbaceous plants.
Mr. C. T. Kipping, Althorne : Chrysanthemums.
Mr. A. Miles, Bickley : Coreopsis ' Southborough Seedling.'
Messrs. Prichard, Christchurch : *Helenium coccineum* ' Brunum.'
Mr. H. Shoesmith, jun., Woking : Chrysanthemums.

September 8, 1931, Mr. G. W. LEAK, V.M.H., in the Chair, and eighteen other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Dobbie, Edinburgh, for Gladioli.
To Messrs. Luxford, Sawbridgeworth, for Chrysanthemums.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.
To Messrs. B. R. Cant, Colchester, for Roses.
To Messrs. Chaplin, Waltham Cross, for Roses.
To Messrs. Cheal, Crawley, for Dahlias and Pentstemons.
To Messrs. Gibson & Amos, Cranleigh, for Gladioli.
To Mr. S. J. Goodliffe, Bishop's Stortford, for Dahlias and herbaceous plants.
To Mr. H. Hemsley, Crawley, for Dahlias.
To Messrs. Ladhams, Southampton, for herbaceous plants.
To Messrs. Langridge, Westerham, for Dahlias and Gladioli.
To Messrs. Lawrence, Chatham, for Chrysanthemums.
To Messrs. Carter Page, London, for Dahlias.
To Messrs. Prior, Colchester, for Roses.

Banksian Medal.

To Messrs. Bentall, Havering, for Roses.
To Messrs. F. Cant, Colchester, for Roses.
To Messrs. Engelmann, Saffron Walden, for Carnations.
To Messrs. Low, Enfield, for Carnations.
To Mr. A. Miles, Bickley, for herbaceous plants.
To Messrs. Redgrove, Borough Green, for herbaceous plants.
To Mr. G. Reuthe, Keston, for herbaceous plants.
To Messrs. Wakeley, London, for Gladioli.
To Messrs. Wheatcroft, Gedling, for Roses.

Award of Merit.

To *Chrysanthemum* ' Avondale Early White ' for cutting and market (votes unanimous), from Messrs. Tyson, Crawley. An early flowering white Incurved variety of medium size.

To *Chrysanthemum* ' Chamois ' for cutting and market (votes 14 for), from Mr. H. Shoesmith, jun., Woking. A bright terra-cotta Decorative variety of very good form.

To *Chrysanthemum* ' Lichfield Cream ' for cutting and market (votes 12 for, 1 against), from Mr. A. W. Thorpe, Lichfield. A rich cream early flowering Incurved variety of good form and medium size.

To *Chrysanthemum* ' Matador ' for cutting and market (votes unanimous), from Mr. H. Shoesmith, jun., Woking. A bright chestnut-red Decorative variety with rolled florets and an old gold reverse.

To *Chrysanthemum* ' Mayford Red ' for cutting and market (votes 11 for), from Mr. H. Shoesmith, jun., Woking. A crimson Decorative variety with wide florets having a golden reverse.

To *Chrysanthemum* ' Petunia ' for cutting and market (votes 13 for), from Mr. H. Shoesmith, jun., Woking. A good, full, Decorative variety of an unusual but pleasing shade of deep rosy-purple.

Selected for trial at Wisley.

Chrysanthemum segetum ' Eldorado,' from Messrs. Dobbie, Edinburgh.

Other Exhibits.

Central Gardens Supplies, Harrow : herbaceous plants.

Messrs. Clark, Dover : herbaceous plants.

Mr. G. R. Downer, Chichester : herbaceous plants.

Messrs. Hayward, Clacton : Dianthus.

Messrs. Treseder, Truro : *Lobelia cardinalis* seedling.

September 23, 1931, Mr. W. CUTHBERTSON, V.M.H., in the Chair, and fifteen other members present.

Awards Recommended :—

Award of Merit.

To *Begonia* ' Violet Blackmore ' as a greenhouse plant (votes unanimous), from Messrs. Blackmore & Langdon, Bath. A clear lemon-yellow tuberous-rooted variety of large size and perfect form.

To *Begonia* ' W. J. Naish ' as a greenhouse plant (votes unanimous), from Messrs. Blackmore & Langdon, Bath. A tuberous-rooted variety with large, fully double, golden-apricot flowers of excellent form edged with orange.

To *Chrysanthemum* ' Avoca ' for cutting and market (votes unanimous), from Mr. H. Shoesmith, jun., Woking. A useful, light-crimson Decorative variety with narrow pointed florets.

To *Chrysanthemum* ' Dawn ' for cutting and market (votes 12 for), from Mr. H. Shoesmith, jun., Woking. A pale rose Decorative variety shaded with fawn.

To *Chrysanthemum* ' Helen Thorpe ' for cutting and market (votes 12 for), from Mr. A. W. Thorpe, Lichfield. A cream Decorative variety suffused with light rose and having the florets slightly cupped at the ends.

To *Chrysanthemum* ' Modesty ' for cutting and market (votes 11 for), from Mr. H. Shoesmith, jun., Woking. A very charming lilac-pink Decorative variety of excellent form.

Selected for trial at Wisley.

Aster, unnamed, from Mr. C. L. Vinsen, Redbourn.

Papaver nudicaule, ' Gibson's Improved Giant Orange,' from Messrs. Gibson, Leeming Bar.

Rose ' Emma Wright,' from Stanway Rose Gardens, Colchester.

Preliminary Commendation.

To Climbing H.T. Rose ' Emma Wright,' from Stanway Rose Gardens, Colchester.

Other Exhibits.

Mr. D. Chinn, Erdington : Chrysanthemum ' Edith Chinn.'

Mr. J. W. Forsyth, Putteridge : Chrysanthemums.

Mr. H. Woolman, Birmingham : Chrysanthemums.

September 30, 1931, Mr. G. W. LEAK, V.M.H., in the Chair, and thirteen other members present.

Awards Recommended :—

Award of Merit.

To *Chrysanthemum* ' Chestnut Glory ' for cutting and market (votes unanimous), from Mr. T. Stevenson, Hillingdon. A light chestnut-red Decorative variety of good form with a golden reverse.

To *Chrysanthemum* ' Crimson Glory ' for cutting and market (votes unanimous), from Mr. H. Shoesmith, jun., Woking. A crimson Decorative variety with narrow florets and a golden reverse.

To *Chrysanthemum* ' Somerset Tints ' for cutting and market (votes 12 for), from Mr. J. Barrell, Bridgewater. An orange-bronze Decorative variety with florets of medium width.

To *Chrysanthemum* 'Welcome' for cutting and market (votes 11 for), from Mr. H. Shoesmith, jun., Woking. A deep orange Decorative variety.

To *Physostegia virginiana* var. 'Vivid' as a hardy border plant (votes unanimous), from Mr. A. Perry, Enfield. A compact growing plant not more than 18 inches high with large deep rosy-lilac flowers.

To Rose 'Violet Simpson' for cutting (votes unanimous), from Messrs Laxton, Bedford. A well-formed salmon-pink H.T. Rose tinged with orange.

Selected for trial at Wisley.

Asters 'Mrs. Sims,' 'Silver Sheen,' and 'Violet,' all from Mr. T. Bones, Cheshunt.

October 6, 1931, Mr. G. W. LEAK, V.M.H., in the Chair, and sixteen other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Mr. S. Ogg, Swanley, for Dahlias.

To Messrs. Carter Page, London, for Dahlias.

To Mr. J. B. Riding, Chingford, for Dahlias.

Silver Banksian Medal.

To Messrs. Cheal, Crawley, for Dahlias.

To Messrs. House, Westbury-on-Trym, for Scabious and Kniphofias.

To Messrs. Prior, Colchester, for Roses.

To Messrs. Wood, Taplow, for Asters.

Banksian Medal.

To Messrs. Bath, Wisbech, for Gladioli, Dahlias, and Nerines.

To Messrs. Blackmore & Langdon, Bath, for Phloxes.

To Messrs. F. Cant, Colchester, for Roses.

To Messrs. Ladhams, Southampton, for herbaceous plants.

To Messrs. Langridge, Westerham, for Dahlias and Gladioli.

To Messrs. Redgrove, Borough Green, for herbaceous plants.

To Messrs. Rich & Cooling, Bath, for herbaceous plants.

To Messrs. Wheatcroft, Gedling, for Roses.

Award of Merit.

To *Chrysanthemum* 'Golden Emperor' for cutting and market (votes unanimous), from Mr. A. G. Vinten, Balcombe. A deep golden-yellow Japanese variety of fine form with narrow florets.

To *Chrysanthemum* 'Harold Larwood' for cutting and market (votes 10 for), from Messrs. J. & T. Johnson, Tibshelf. A good light bronze Incurved variety with florets of medium width.

To *Chrysanthemum* 'Yellow Queen' for cutting and market (votes 13 for), from Mr. H. Shoesmith, jun., Woking. A rich golden-yellow Incurved variety of good size and pleasing form.

Selected for trial at Wisley.

Asters 'Duplex,' 'Lady Hunsdon,' 'My Choice,' 'Redstart,' 'The Don,' and 'The Joker,' from Hon. Vicary Gibbs, V.M.H., Elstree.

Gladiolus 'Anthony Kunderd' from C. Ingram Esq., Benenden.

The following plants received awards after trial at Wisley.

Award of Merit.

To *Aster* 'Gayborder Beauty' sent by Gayborder Nurseries, Melbourne. Compact erect habit, 4 feet tall; flowers semi-double, 2 inches diameter, lavender-mauve, flowering freely, *Novi-belgii*. Raised by sender.

Chrysanthemum 'Dandelion' sent by Mr. H. Shoesmith, jun., Woking. Habit bushy, 2 feet tall; inflorescence loose; flowers double, 2 to 2½ inches diameter, compact, bright rich yellow; rays stiff, curled and pointed. Flowering very freely. Raised by sender.

The awards recommended to Annual Scabious on trial at Wisley were confirmed (see p. 121).

Other Exhibits.

Messrs. Clark, Dover: herbaceous plants.

Messrs. Dutton, Iver: Chrysanthemum 'White Ladies.'

Mr. J. J. Kettle, Corfe Mullen: Violets.

Messrs. Wood, Taplow: Asters 'Chieftain' and 'Blue Prince.'

G. Yeld, Esq., Gerrards Cross: Aster 'Ruffilo.'

November 3, 1931, Mr. G. W. LEAK, V.M.H., in the Chair, and nineteen other members present.

Awards Recommended :—

Gold Medal.

To the British Flower Marketing Association, London, for plants and flowers packed for market.

Silver-gilt Banksian Medal.
To Messrs. Engelmann, Saffron Walden, for Carnations.
Silver Banksian Medal.
To Messrs. Allwood, Haywards Heath, for Carnations.
Flora Medal.
To Messrs. Dobbie, Edinburgh, for Dahlias.
Banksian Medal.
To Messrs. Low, Enfield, for Carnations.
Award of Merit.
To *Chrysanthemum* 'Apollo' for cutting and market (votes unanimous), from Mr. H. Shoesmith, jun., Woking. A rich red Decorative variety with a golden reverse.
To *Chrysanthemum* 'Snowball' for cutting and market (votes unanimous), from Messrs. Chatfield, Southwick. A solid white Incurved sport from 'Edmonton White.'
Selected for trial at Wisley.
Carnation 'Blanche Aileen' from Messrs. Low, Enfield.
Other Exhibits.
Mr. D. Chinn, Erdington: Chrysanthemum 'Yenton.'
Misses Hopkins, Coulsdon: hardy plants.
Mr. J. Murray, Aboyne: seedling Asters.
Mr. E. J. Winter, Chiseldon: Chrysanthemum 'A.G.'

November 24, 1931, Mr. G. W. LEAK, V.M.H., in the Chair, and eighteen other members present.
Awards Recommended:—
Silver Banksian Medal.
To Messrs. Allwood, Haywards Heath, for Carnations.
To Messrs. Blackmore & Langdon, Bath, for Cyclamen.
To Messrs. Cutbush, Barnet, for Begonias.
To Messrs. Jones, Lewisham, for Chrysanthemums.
To Messrs. Luxford, Sawbridgeworth, for Chrysanthemums.
To Madresfield Gardens, Ltd., Malvern, for Begonias.
To Messrs. Sutton, Reading, for Cascade Chrysanthemums.
To Mr. A. G. Vinten, Balcombe, for Chrysanthemums.
Banksian Medal.
To Messrs. Engelmann, Saffron Walden, for Carnations.
To Lady Lock (gr. Mr. W. Blyth), Stoke-by-Clare, for Cascade Chrysanthemums raised from seed sent from the Imperial Gardens, Tokyo.
To Messrs. Low, Enfield, for Begonias, etc.
To Mr. S. Ogg, Swanley, for Chrysanthemums.
Award of Merit.
To *Begonia* 'Clibran's Rose Star' as a greenhouse pot plant (votes unanimous), from Messrs. Clibran, Altrincham. This and the following variety resulted from a cross between a small flowered tuberous-rooted Begonia and *B. socotrana*. It is very free flowering and compact in habit. The flowers are single and rose-pink in colour.
To *Begonia* 'Clibran's Salmon Star' as a greenhouse pot plant (votes 11 for, 4 against), from Messrs. Clibran, Altrincham. Similar in habit and origin to the foregoing but of a pale salmon-pink colour.
To *Begonia* 'Flambeau' as a greenhouse pot plant (votes unanimous), from Lady Leconfield (gr. Mr. F. Streeter), Petworth. A very striking variety with small double scarlet flowers.
To *Chrysanthemum* 'Ivernia' for cutting and market (votes unanimous), from Mr. H. Shoesmith, jun., Woking. A useful Decorative variety with medium-sized fiery orange-chestnut flowers of good form.
To *Chrysanthemum* 'Leonard Shoesmith' for cutting and market (votes 13 for, 3 against), from Mr. H. Shoesmith, jun., Woking. A deep crimson Japanese variety with long narrow florets.
To *Chrysanthemum* 'Lion d'Or' for cutting and market (votes 13 for), from Mr. H. Shoesmith, jun., Woking. A golden-yellow Japanese variety suffused with light chestnut.
Selected for trial at Wisley.
Cascade Chrysanthemum 'Sutton's Special Strain' from Messrs. Sutton, Reading.
Other Exhibits.
Mr. P. Burr, Northampton: Chrysanthemum 'Lucy Scott-Robson.'
Mr. G. Carpenter, Byfleet: Chrysanthemum 'Unique.'
Mr. A. Eames, Hinckley: Chrysanthemum.

Mr. D. Foxwell, Balcombe : Chrysanthemum 'Alan Foxwell.'
Mr. G. Grant, Aylesbury : Cyclamen.
Misses Hopkins, Coulsdon : hardy plants.
Mr. A. Humphrey, Henfield : Chrysanthemum ' Sunset.'
Sir Samuel Roberts, M.P., Swaffham : Begonia sport similar to ' Mrs. Harry Barton,' **A.M.** 1914.

December 15, 1931, Mr. W. CUTHBERTSON, J.P., V.M.H., in the Chair, and seventeen other members present.

Awards Recommended :—

Gold Medal.

To Mr. P. Ladds, Swanley Junction, for Heaths and Hyacinths.

To Baron Bruno Schröder (gr. Mr. E. J. Henderson), Englefield Green, for Begonias.

Silver-gilt Banksian Medal.

To Mr. A. G. Vinten, Balcombe, for Chrysanthemums.

Silver Banksian Medal.

To Messrs. Engelmann, Saffron Walden, for Carnations, Roses and Lachenalias.

To Messrs. Low, Enfield, for Carnations and other greenhouse plants.

To Messrs. Luxford, Sawbridgeworth, for Chrysanthemums.

Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Mr. H. Woolman, Birmingham, for Chrysanthemums.

Award of Merit.

To *Chrysanthemum* ' Mary Kirkwood ' for cutting and market (votes 10 for, 2 against), from Mr. H. Shoesmith, jun., Woking. A clear yellow, flattish Japanese variety of good size. The florets are curled and the lower ones are slightly bronzed.

To *Chrysanthemum* ' Yuvawn ' for cutting and market (votes 14 for), from Messrs. Luxford, Sawbridgeworth. A very neat bright yellow Pompon variety.

Cultural Commendation.

To Mr. S. Capon, gardener to the Duke of Richmond and Gordon, Goodwood, for a very fine plant of Begonia ' Gloire de Lorraine ' var. ' Mrs. A. Rothschild.'

Other Exhibits.

Mr. G. Baker, Girton : Chrysanthemum ' Geoffrey Baker.'
P. W. Carver, Esq., Sharpthorne : Chrysanthemum ' Nancy.'
Mr. W. H. Elliott, Henfield : Chrysanthemum ' Heather.'
Mr. I. Godber, Willington : Chrysanthemum ' White Phryne.'
Mr. J. Hanagan, Liverpool : Chrysanthemum ' John Hanagan's Pink.'
Misses Hopkins, Coulsdon : hardy plants.
Mrs. Christie Miller, Salisbury : Begonia ' Red Star.'
Mr. H. Woolman, Birmingham : Chrysanthemums.

FLORAL COMMITTEE, Section B.

August 11, 1931, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended :—

Gold Medal.

To the Hon. Vicary Gibbs, Elstree, for Pelargoniums.

Silver Banksian Medal.

To Messrs. Bunyard, Maidstone, for ornamental Crabs.

Banksian Medal.

To Mr. W. A. Constable, Paddock Wood, for Lilies.

Award of Merit.

To *Gentiana* × *hexa-farreri* as a hardy flowering plant (votes unanimous), from A. G. Weeks, Esq., Limpsfield Common. *Gentiana hexaphylla* and *G. Farreri*, both of which have received the Society's awards, are the parents of this promising hybrid. The prostrate growths are very leafy, and each terminates in a large, erect flower. The tube of the corolla is pale, striped with blue externally and with greenish-yellow inside ; the rim is brilliant sky-blue.

To *Magnolia grandiflora* var. ' Goliath ' as a hardy flowering tree (votes unanimous), from E. M. Preston, Esq., Hayes, Kent. A very fine variety of a well-known evergreen. The massive leaves are oval in shape, rugose above and sparingly tomentose beneath. The large, globular, white flowers are of solid texture and exhale a delicious scent.

Other Exhibits.

G. W. W. Blathwayt, Esq., Porlock : Buddleia ' Porlockensis.'

Mr. A. Hansen, New Barnet : rock plants.

Messrs. Ladhams, Southampton : Buddleia ' B. Ladhams.'

A. J. Sewell, Esq., Weybridge : *Crassula sarcocaulis.*

Major G. H. Tristram, Westerham : *Calceolaria pinnata.*

W. Van de Weyer, Esq., Dorchester : *Carissa* sp.

August 25, 1931, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and twelve other members present.

Award Recommended :—

Banksian Medal.

To Mr. G. Reuthe, Keston, for hardy plants.

Other Exhibits.

Sir Wm. Lawrence, Bt., Burford : *Hoheria populnea Osbornei, Coreothrogyne californica.*

Mr. W. Wells, jun., Merstham : *Gentiana* × *Macaulayi, G. Purdomii alba.*

September 8, 1931, Mr. G. W. E. LODER, F.L.S., in the Chair, and twelve other members present.

Awards Recommended :—

Banksian Medal.

To Messrs. Russell, Richmond, for shrubs.

Award of Merit.

To *Gentiana* × *Macaulayi* as a hardy flowering plant (votes unanimous), from R. Macaulay, Esq., Kirman, Kilmichael Glassary, Argyll. A beautiful plant believed to be a hybrid of *G. sino-ornata* and *G. Farreri*. The flowers are bright blue, the throat white with longitudinal blue stripes. In foliage, and in the disposition of its flowers, the present plant closely resembles *G. Farreri*.

To *Gentiana* × *Macaulayi*, Wells' variety, as a hardy flowering plant (votes unanimous), from Mr. W. Wells, jun., Merstham. A variety of the preceding, than which the plant shown appeared more vigorous in growth and more floriferous.

To *Gentiana ornata* as a hardy flowering plant (votes unanimous), from T. Hay, Esq., Hyde Park. This species received the Botanical Certificate on September 9, 1930, when a Certificate of Cultural Commendation was awarded to Mr. Hay for the plant exhibited. A descriptive note is given in the JOURNAL, vol. **56**, p. cx.

To *Kniphofia Snowdenii* as a hardy flowering plant (votes 7 for, 1 against), from T. Hay, Esq., Hyde Park. A slender species from Mt. Elgon in Uganda, where it grows at an elevation of 10,000 feet. The leaves are linear, and form a tuft 2 feet high, from which the scape rises to a height of 3 or 4 feet. The raceme

is comparatively few-flowered, the pendent flowers tubular, decurved, red in the bud stage, golden suffused with rose when fully open.

To *Petrocosmea nervosa* as a flowering plant for the greenhouse (votes unanimous), from Colonel Stephenson R. Clarke, C.B., Borde Hill, Haywards Heath. Petrocosmea is a small Chinese genus of the Gesneriaceae; it is allied and similar in aspect to the East African *Saintpaulia ionantha*. It forms a rosette of fleshy, ovate leaves, and from among these arise the solitary, Violet-like flowers.

To *Rhododendron rhabdotum* as a hardy flowering shrub (votes 6 for, 1 against), from Lady Aberconway and the Hon. H. D. McLaren, Bodnant. A species of the Maddenii series, shown under the number K.W. 6415. It forms a tree 12 feet high. Leaves ovate-oblong, 3–5 inches long, glaucous and scaly beneath. Inflorescence few-flowered; flowers large, calyx green, corolla widely funnel-shaped, creamy white, deeply suffused yellow within and marked externally with five longitudinal red stripes.

Preliminary Commendation.

To *Crinum Prainianum* (votes unanimous), from Lady Aberconway and the Hon. H. D. McLaren, Bodnant.

Other Exhibits.

Lady Aberconway and the Hon. H. D. McLaren, Bodnant: *Vaccinium glauco-album.*

Major L. H. Brammall, Bickley: rock plants.

Colonel S. R. Clarke, Haywards Heath: *Vitis megalophylla.*

Mr. A. Hansen, New Barnet: rock plants.

Mr. H. Hemsley, Crawley: *Chrysanthemum Mawii.*

Sir Wm. Lawrence, Bt., Burford: *Viburnum Opulus fructu-luteo, V. Opulus xanthocarpum.*

September 23, 1931, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and nineteen other members present.

Award Recommended:—

Award of Merit.

To *Gentiana Veitchiorum* as a hardy flowering plant (votes unanimous), from the Hocker Edge Gardens, Cranbrook. The award granted to this species, when shown as *G. ornata* by Messrs. James Veitch & Sons on August 30, 1909, is now confirmed. *G. Veitchiorum* is a Chinese species, first collected by the late E. H. Wilson. It forms a tufted, prostrate plant bearing flowers of rich, deep blue.

Other Exhibits.

Mr. E. Ballard, Colwall: Solidago hybrids.

Dr. P. L. Giuseppi, Felixstowe: *Sempervivum calcareum* 'Mrs. Giuseppi.'

The Marquess of Headfort, Kells: *Berberis morrisonensis, Cyananthus longiflorus, Schizandra rubrifolia.*

Sir Wm. Lawrence, Bt., Burford: *Mutisia subulata.*

Messrs. Reeves, Norwich: *Crataegus Oxyacantha variegata.*

John Scott, Esq., Balham: *Richardia Rehmannii.*

Admiral Heneage-Vivian, Swansea: *Colletia spinosa, Clerodendron ugandense.*

Mr. W. Wells, jun., Merstham: *Gentiana* × *Macaulayi*, Wells' variety.

September 30, 1931, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and eighteen other members present.

Awards Recommended:—

Award of Merit.

To *Coriaria terminalis* as a hardy, ornamental-fruiting shrub (votes 14 for), from Sir Wm. Lawrence, Bt., Burford. A handsome sub-shrub a yard high. Leaves opposite, ovate, 1 to 2 inches long, sharply pointed. Inflorescence terminal, racemose; flowers inconspicuous, followed by abundant, dark red fruits. The plant which received the **A.M.** in 1904, under the name *C. terminalis*, is the yellow-fruited variety *C. terminalis xanthocarpa.*

Preliminary Commendation.

To *Gentiana rigescens* as a hardy flowering plant (votes 13 for, 2 against), from C. T. Musgrave, Esq., Godalming. An uncommon species collected by Forrest in Yunnan. It is a tall plant with lanceolate, deep green leaves and terminal, clustered inflorescences. The flowers are of medium size and of a rather pleasing light violet colour.

Other Exhibits.

Messrs. Ladhams, Southampton: *Hypericum hircinum* variety.

Sir Wm. Lawrence, Bt., Burford: *Tricyrtis hirta.*

Lady Leconfield, Petworth: Clematis 'Oiseau Bleu,' C. 'Côte d'Azur,' C. 'Campanile.'
C. T. Musgrave, Esq., Godalming: *Swertia* sp.
Messrs. Neale, Newhaven: Gazanias.
Mr. A. Perry, Enfield: *Nerine filifolia.*
Messrs. Simmonds, King's Langley: *Cotoneaster frigida* variety.
Messrs. Wallace, Tunbridge Wells: Berberis 'Pearl of Kent.'
W. van der Weyer, Esq., Dorchester: Buddleia × 'Violette.'
The Director, R.H.S. Gardens, Wisley: *Viburnum betulifolium.*

October 6, 1931, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and thirteen other members present.

Exhibits.

A. Grove, Esq., London: *Gladiolus Quartinianus.*
C. Ingram, Esq., Benenden: *Hydrangea Hortensia fl. pl.*
Sir Wm. Lawrence, Bt., Burford: Berberis seedlings.
Viscountess St. Cyres, Lymington: *Eucryphia Moorei.*

November 3, 1931, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and twenty-two other members present.

Awards Recommended:—

Silver-gilt Flora Medal.

To Messrs. Russell, Richmond, for stove plants.

Silver Banksian Medal.

To Mr. Amos Perry, Enfield, for Liliums.

Other Exhibits.

A. J. Cobb, Esq., Reading: *Salvia leucantha.*
Sir Wm. Lawrence, Bt., Burford: *Berberis virescens.*

November 11, 1931 (CONIFER CONFERENCE), the Hon. H. D. MCLAREN, C.B.E., in the Chair, and ten other members present.

Awards Recommended:—

Award of Merit.

To *Athrotaxis selaginoides* as a half-hardy evergreen tree (votes unanimous), from the Marquess of Headfort, Kells, Co. Meath. A species from the western mountains of Tasmania, where it forms a tree 100 feet high. It is suitable for the milder parts of Britain. The irregularly disposed branches bear many small twigs covered by thick leaves ⅛ inch long, curved and pointing forward. Cones woody, ¾ inch long and broad.

To *Callitris oblonga* as a half-hardy evergreen shrub (votes 7 for), from the Marquess of Headfort. Another Tasmanian species, suitable only for more favoured localities. It forms a large, erect bush of symmetrical outline. The branches are very abundantly furnished with slender green twigs, the leaves of which are closely appressed and scale-like. The large, conical, persistent cones are clustered and consist of six erect scales.

To *Taiwania cryptomerioides* as a hardy evergreen shrub (votes 9 for), from Lady Aberconway and the Hon. H. D. McLaren, Bodnant, and the Marquess of Headfort. An interesting species from the Island of Formosa, described and illustrated in the Journal of the Linnean Society, vol. xxxvii, p. 330. It seems to come near Cunninghamia, but differs slightly in the structure of its cones. It has somewhat the habit of Cryptomeria, with copiously branched twigs bearing small, thick, scale-like leaves.

To *Tsuga Brunoniana* as a half-hardy evergreen tree (votes 7 for), from the Marquess of Headfort. A very beautiful Hemlock Spruce from the Himalaya. It is a graceful tree with drooping branches, the young shoots light brown, set with numerous linear, pointed leaves, dark green above, silvery beneath. The small, pendulous, polished cones are borne at the tips of lateral twigs.

To *Tsuga yunnanensis* as a hardy evergreen tree (votes 6 for), from the Marquess of Headfort. The Yunnan Hemlock. A plant of fairly recent introduction, still rare in cultivation. In China it forms a tree 100 feet high, with stout branches. The leaves are more loosely arranged than in the preceding species, the cones smaller and dull in colour.

To *Vaccinium glauco-album* as a hardy, ornamental-fruiting shrub (votes 6 for), from Lady Aberconway and the Hon. H. D. McLaren, Bodnant. The specimen shown was a bushy pot-plant, nearly 2 feet high. The spreading branchlets bore many pale green, ovate leaves of stiff texture and clusters of short racemes of pale blue fruits about the size of currants.

Other Exhibits.

Lady Aberconway and the Hon. H. D. McLaren, Bodnant: *Libocedrus chilensis, L. Bidwillii, Widdringtonia juniperoides, W. cupressoides, W. Schwarzii, Rhododendron Kyawi.*

The Dowager Countess Cawdor, Haslemere: fruiting specimens of *Cercidiphyllum japonicum, Davidia involucrata.*

The Marquess of Headfort, Kells, Co. Meath: *Cupressus Duclouxiana, C. Lawsoniana Headfortii, Juniperus Wallichiana, J. formosana, Phyllocladus trichomanoides, Abies koreana, A. Kawakamii, Thuya koraiensis, Libocedrus Bidwillii, Podocarpus nubigena, Abies Forrestii, Cunninghamia lanceolata, Widdringtonia Schwarzii, Tetraclinis articulata, Callitris rhomboidea.*

Sir Wm. Lawrence, Bt., Burford: *Cunninghamia Konishii.*

Messrs. F. Gomer Waterer's Knaphill Nursery, Ltd.: *Cupressus pisifera Sanderi.*

November 24, 1931, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and seventeen other members present.

Awards Recommended:—

Silver Banksian Medal.

To Mr. H. Hemsley, Crawley, for shrubs.

Banksian Medal.

To Central Garden Supplies, Kenton, for dwarf conifers.

To Messrs. Russell, Richmond, for shrubs.

Other Exhibit.

Lionel de Rothschild, Esq., Exbury: *Gaultheria Forrestii.*

December 15, 1931, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and sixteen other members present.

Awards Recommended:—

Banksian Medal.

To Mr. H. Hemsley, Crawley, for shrubs.

Cultural Commendation.

To Mr. Everatt, gardener to Sir Wm. Lawrence, Bt., Burford, for *Agapetes macrantha.* This plant was introduced by Messrs. Veitch from Kola Mountain, Moulmein, and flowered for the first time in 1850. Ten years later it received the Society's **F.C.C.** It is a straggling shrub with smooth, light brown bark and leathery, dark green lanceolate leaves. The pendent flowers are borne in extra-axillary clusters of three or more. The corolla is 2½ inches long, flask-shaped and of waxy texture: in colour white, tinged with yellow at either end and suffused with lilac. Its beauty is enhanced by the presence of wavy, red lines. An unusual and interesting species, figured at t. 4566 of the *Botanical Magazine* as *Thibaudia macrantha.*

Other Exhibits.

Lady Aberconway and the Hon. H. D. McLaren, Bodnant: *Narcissus* sp.

Central Garden Supplies, Kenton: dwarf conifers.

Sir Wm. Lawrence, Bt., Burford: *Lachenalia pendula* var. *Aureliana.*

Messrs. Russell, Richmond: shrubs.

ORCHID COMMITTEE.

August 11, 1931, F. J. HANBURY, Esq., in the Chair, and eight other members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. Charlesworth, Haywards Heath, for a group.

Banksian Medal.

To Messrs. Stuart Low, Jarvis Brook, for a group.

Other Exhibits.

R. Paterson, Ardingly : *Cattleya* × ' Gloriette ' and *Miltonia* hybrids.

Messrs. H. G. Alexander, Tetbury : *Laeliocattleya* × ' Adonis.'

August 25, 1931, Sir JEREMIAH COLMAN, Bt., in the Chair, and nine other members present.

Award Recommended :—

Award of Merit.

To *Cattleya* × ' John Henry ' var. ' Amabilis ' (' Lady Rowena ' × ' Astron ') (votes 8 for), from Baron Bruno Schröder, Englefield Green, Surrey. The spike bore three round white flowers with an orange-yellow disc in the throat portion of the labellum.

Other Exhibits.

F. J. Hanbury, Esq., East Grinstead : *Cattleya* × ' King George.'

Baron Bruno Schröder, Englefield Green : *Brassocattleya* × ' Prince Shimadzu,' in four varieties.

Messrs. McBean, Cooksbridge : *Laeliocattleya* × ' President Wilson ' var. ' Vivid.'

September 8, 1931, Sir JEREMIAH COLMAN, Bt., in the Chair, and thirteen other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Charlesworth, Haywards Heath, for a group.

Silver Banksian Medal.

To Messrs. Sanders, St. Albans, for a group.

Banksian Medal.

To Messrs. Cowan, Southgate, for a group.

To Mr. John Evans, Colwyn Bay, for a group.

Award of Merit.

To *Brassolaeliocattleya* × ' Lady Barker ' (*B.-c.* × ' Ilene ' × *B.-l.-c.* × ' Queen of the Belgians ') (votes 12 for), from Mrs. Carl Holmes, The Node, Hitchin. Flower unusually large, of soft rosy-pink colour, the labellum purple and with an orange-yellow throat.

To *Laeliocattleya* × ' Almandin ' (*L.-c.* × ' Ivanhoe ' × *C. Dupreana*) (votes unanimous), from Baron Schröder, Englefield Green. Flowers of rich purplish colour, the labellum dark crimson.

To *Sophrolaeliocattleya* × ' Alcon ' var. ' Ruby ' (*S.-l.-c.* × ' Laura ' × *L.-c.* × ' Momus ') (votes unanimous), from Messrs. Charlesworth, Haywards Heath. Flower of medium size, the segments roundly formed, bright purple tinged with rose-red.

To *Odontonia* × ' Nesta ' var. *splendens* (*Odontonia* × ' Gladys ' × *Odontoglossum* × ' St. George ') (votes unanimous), from Messrs. McBean, Cooksbridge. Spike of six flowers, which are heavily marked with chocolate-red.

Cultural Commendation.

To Mr. A. Merry, Orchid grower to Robert Paterson, Esq., Ardingly, Sussex, for *Vuylstekeara* × ' Edna,' Stamperland var., with two spikes bearing a total of forty-five flowers and buds.

To Messrs. Cowan, Southgate, for *Cirrhopetalum Rothschildianum*, with an umbel of seven richly coloured flowers.

Other Exhibits.

Messrs. Stuart Low : various *Cattleyas.*

Messrs. H. G. Alexander, Tetbury : *Cattleyas* and *Laeliocattleyas.*

J. J. Joicey, Esq., Witley : *Cypripedium* × *witleyense.*

Baron Schröder, Englefield Green : *Brassolaeliocattleya* × ' C. W. Mathes ' and *Cattleya* × ' Prince Shimadzu.'

September 23, 1931, E. R. ASHTON, Esq., in the Chair, and eleven other members present.

Awards Recommended :—

Award of Merit.

To *Brassolaeliocattleya* × ' Flavida,' Dell Park var. (*B.-l.-c.* × ' Amber ' × *L.-c.* × ' Golden Queen ') (votes unanimous), from Baron Schröder, Englefield Green, Surrey. Of a pleasing yellow colour, the labellum rose-carmine and frilled at the margin.

To *Odontonia* × ' Regina,' Clovelly var. (*Odontonia* × ' Gladys ' × *Odm.* × ' Doreen ') (votes unanimous), from Frank Mercer, Esq., Steyning, Sussex. Spike of six flowers, sepals and petals blotched with purplish-crimson, the labellum profusely spotted.

To *Cattleya* × ' A. M. Nicholas ' (*Hardyana* × ' Dinah ') (votes unanimous), from F. J. Hanbury, Esq., East Grinstead. The spike bore three large flowers of rosy-purple colour, the labellum tinged with crimson.

To *Miltonia* × ' Mrs. Carl Holmes ' (' Gertrude West ' × *pulchra*) (votes 7 for, 2 against), from Messrs. Black & Flory, Slough. Of intense velvety crimson colour, the labellum having a dark brown mask at its base.

To *Sophrolaeliocattleya* × ' Ramona ' var. ' Redwing ' (*L.-c.* × ' Linda ' × *S.-l.-c.* × ' Meuse ') (votes unanimous), from Messrs. McBean, Cooksbridge. Fawn-yellow suffused with reddish-pink.

Other Exhibits.

Robert Paterson, Esq., Ardingly : *Brassocattleya* × ' John Linford.'

Messrs. Black & Flory, Slough : *Cattleya* × ' Etta ' var. ' The Pearl.'

Messrs. Charlesworth, Haywards Heath : *Brassolaeliocattleya* × ' Ophelia ' var. ' Peerless.'

September 30, 1931, Sir JEREMIAH COLMAN, Bt., in the Chair, and twelve other members present.

Awards Recommended :—

Award of Merit.

To *Sophrolaeliocattleya* × ' Yokohama,' Dell Park var. (*S.-l.-c.* × ' Prince Hirohito ' × *C.* × ' Hesperus ') (votes 8 for, 1 against), from Baron Bruno Schröder, Englefield Green, Surrey. The spike bore three flowers, fawn-yellow tinged with rose, the labellum ruby-crimson.

To *Brassocattleya* × ' Penelope,' Stonehurst var. (*B.-c.* × ' Mme. Chas. Maron ' × *C.* × ' Fabia ') (votes 10 for), from Robert Paterson, Esq., Ardingly, Sussex. Spike of three large flowers, whitish with rose freckling, the lip fringed.

To *Cattleya* × ' Stella ' var. ' Vivid ' (*C.* × ' Enid ' × *C. Thurgoodiana*) (votes 11 for, 1 against), from Robert Paterson, Esq. Rich purple-mauve, the labellum Tyrian purple.

To *Laeliocattleya* × ' Mrs. Medo,' Brockhurst var. (*C.* × ' Venus ' × *L.-c.* × *luminosa aurea*) (votes 7 for, 3 against), from F. J. Hanbury, Esq., East Grinstead. Rich yellow with bronze shading, the labellum crimson-purple.

Other Exhibits.

Henry P. Lawson, Esq., Knaphill, Woking : *Dendrobium taurinum.*

Baron Schröder, Englefield Green : *Potinara* × ' Dorothy.'

October 6, 1931, Sir JEREMIAH COLMAN, Bt., in the Chair, and ten other members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. Stuart Low, Jarvis Brook, Sussex, for a group.

Award of Merit.

To *Cattleya* × ' White Pearl ' (' Saturn ' × ' Lady Veitch ') (votes unanimous), from Messrs. Charlesworth, Haywards Heath. Flower of model form, pure white, except for some lemon-yellow in the throat.

To *Cattleya* × ' Etta ' var. ' Venus ' (' Mrs. J. Ansaldo ' × *Warscewiczii*) (votes 7 for), from Mrs. Carl Holmes, The Node, Codicote, Hitchin. Sepals and petals milk-white, labellum light purple.

To *Brassocattleya* × ' Amersham ' var. ' Mrs. K. Stanley Smith ' (*C.* × ' G. P. Walker ' × *B.-c.* × ' Ilene ') (votes 7 for, 3 against), from Mrs. Carl Holmes. Large, pale mauve, the labellum purple and with the margin fringed and undulated.

Other Exhibits.

Baron Schröder : *Cattleya* × ' Horos.'

Mrs. Carl Holmes : *Laeliocattleya* × ' Gothaurea.'

November 3, 1931, Sir JEREMIAH COLMAN, Bt., in the Chair, and seventeen other members present.

Awards Recommended:—

Gold Medal.

To Messrs. Sanders, St. Albans, for a group.
To Robert Paterson, Esq., Ardingly, for a group.
To Messrs. McBean, Cooksbridge, for a group.
To Baron Bruno Schröder, Englefield Green, for a group.

Silver-gilt Flora Medal.

To Messrs. Black & Flory, Slough, for a group.
To Messrs. H. G. Alexander, Tetbury, for a group.
To Messrs. Charlesworth, Haywards Heath, for a group.

Silver Flora Medal.

To J. J. Joicey, Esq., Witley, for a group.
To Sir Jeremiah Colman, Bt., Gatton Park, Surrey, for a group.
To Messrs. Stuart Low, Jarvis Brook, for a group.

Silver Banksian Medal.

To Messrs. John Cowan, Southgate, for a group.

Bronze Banksian Medal.

To Messrs. Harry Dixon, Wandsworth Common, for a group.
To Mr. John Evans, Colwyn Bay, for a group.

Schröder Challenge Cup.

To Robert Paterson, Esq., for a group.

Challenge Cup for group not exceeding 60 sq. ft.

J. J. Joicey, Esq.

Silver Trophy for the best six Orchids.

J. McCartney, Esq., Hey House, Bolton.

First-class Certificate.

To *Laeliocattleya* × 'Moloch' var. 'Sidon' (*L.-c.* × 'St. Gothard' × *L.-c.* × 'Sargon') (votes 16 for), from Lionel de Rothschild, Esq., Exbury, Southampton. Large flowers of lustrous purple, the labellum royal-purple with a gold-veined throat.

To *Laeliocattleya* × 'Cœur de Lion' (*L.-c.* × 'Ivanhoe' × *L.-c.* × 'Mrs. Pemberton') (votes 15 for), from Baron Schröder. Sepals and petals purplish-mauve, the round labellum deep crimson-purple, frilled at the margin.

Award of Merit.

To *Cypripedium* × 'Mrs. Geoffrey Webb' ('Camactaeus' × 'Achilles') (votes 12 for), from F. J. Hanbury, Esq., Brockhurst, East Grinstead. Bright greenish-gold, the apex of the dorsal sepal white.

To *Odontoglossum crispum*, Stonehurst var. (votes 15 for), from Robert Paterson, Esq. Spike of thirteen flowers, white, tinged with rose, the labellum with a prominent red-brown blotch.

To *Laeliocattleya* × 'Crusader,' Stonehurst var. (*L.-c.* × 'Soulange' × *C.* × 'Empress Frederick') (votes 15 for), from Robert Paterson, Esq. Flowers large, soft mauve, labellum with a purple apex.

To *Odontoglossum* × 'Muralis' ('Clovis' × 'Penelope') (votes 11 for, 5 against), from Robert Paterson, Esq. Spike of fifteen buds and flowers, reddish-purple, with whitish margins to the segments.

To *Brassocattleya* × 'Dr. Wilmer' var. 'Excelsior' (*C.* × 'Prince Shimadzu' × *B.-c.* × 'Dr. G. MacDonald') (votes 15 for), from Messrs. Black & Flory. Flower large, mauve-pink, the labellum margined with deep purple.

To *Cattleya* × 'Prince Shimadzu,' Dell Park var. (*C. Hardyana* × *C.* 'Tityus') (votes 13 for), from Baron Schröder. Flowers unusually large, light mauve, the labellum with a purple apex.

To *Vanda Sanderiana*, Lawson's var. (votes unanimous), from H. P. Lawson, Esq., Lynbrook, Woking. The sepals and petals are broader than those of the type; the two lower sepals are pale green with reddish-brown venation.

To *Dendrobium* × 'Louis Bleriot' var. 'Alpha' (*phalaenopsis* × *superbiens* (votes unanimous), from Messrs. Sanders, St. Albans. The spike bore sixteen rich mauve flowers.

To *Cattleya* × 'Majestic' var. 'Sola' (*Abekeniae* × 'Fabia') (votes 11 for, 4 against), from Messrs. Sanders. A showy flower, rose-purple, the labellum having a dark purple apex and a gold-veined throat.

Cultural Commendation.

To Mr. A. Merry, Orchid grower to R. Paterson, Esq., for *Cattleya* × 'Annette,' with fourteen flowers and buds; and for *Odontoglossum* × 'Toreador' var. 'Neuance' with thirty-six flowers and buds.

Other Exhibits.

Messrs. Armstrong & Brown, Tunbridge Wells: *Oncidium macrantham* var. *splendens* and *Cattleya labiata* var. 'Mrs. E. Ashworth.'

F. J. Hanbury, Esq., East Grinstead: *Brassocattleya* × 'Mrs. John Netherway.'

Gus Mayer, Esq., Woldingham: *Brassocattleya* × 'Madeline.'

Sir George H. Kendrick, Whetstone, Edgbaston: *Vanda* × *Moorei*.

Dr. Frank T. Paul, Cloudeslee, Headley Road, Grayshott: *Cypripedium* × 'Psyche.'

November 24, 1931, Sir JEREMIAH COLMAN, Bt., in the Chair, and fourteen other members present.

Awards Recommended:—

Gold Medal.

To Baron Bruno Schröder, The Dell Park, Englefield Green, Surrey, for a group.

Silver Banksian Medal.

To Messrs. Sanders, St. Albans, for a group.

To Messrs. Charlesworth, Haywards Heath, for a group.

Banksian Medal.

To Messrs. Stuart Low, Jarvis Brook, Sussex, for a group.

To Messrs. Cowan, Southgate, for a group.

Vote of Thanks.

To Messrs. H. G. Alexander, Tetbury, Glos., for a group.

First-class Certificate.

To *Dendrobium Sanderae* var. 'Lynbrook' (votes unanimous), from Henry P. Lawson, Esq., Lynbrook, Woking. The plant bore two racemes, with seven and six flowers, respectively, pure white, except for some dark purplish lines on the throat area of the labellum.

To *Brassolaeliocattleya* × 'Ponticus,' Stonehurst var. (*B.-l.-c.* × 'Muriel' × *C.* × 'Leda') (votes 11 for, 5 against), from Robert Paterson, Esq., Ardingly. Well-formed flowers of mauve-purple, the labellum with a golden area in the centre.

To *Brassolaeliocattleya* × 'Yellow Hammer' var. 'Betty Lawson Johnston' (*L.-c.* × 'Orange Blossom' × *B.-c.* × 'Mrs. J. Leemann') (votes 13 for, 2 against), from Mrs. Carl Holmes, The Node, Codicote, Hitchin. Of large size and entirely yellow in all the segments.

Award of Merit.

To *Cymbidium* × 'Grand Monarch' (*grandiflorum* × *Wiganianum*) (votes unanimous), from Messrs. McBean, Cooksbridge, Sussex. Spike of ten large flowers, yellowish-green minutely spotted with red-brown.

To *Odontoglossum* × 'Neron' var. 'Jean Campbell' ('Rosina' × 'Llewelyn') (votes unanimous), from Frank Mercer, Esq., 'Clovelly,' Steyning, Sussex. Spike of twelve flowers, deep rose with a crimson-purple suffusion.

To *Cymbidium* × 'Lucastes,' Brockhurst var. (*grandiflorum* × 'Warbler') (votes 14 for), from F. J. Hanbury, Esq., Brockhurst, East Grinstead. Flowers of large size, clear light yellow, the labellum spotted with brown.

To *Laeliocattleya* × 'Trivanhoe' (*C. Trianae* × *L.-c.* × 'Ivanhoe') (votes 15 for), from Baron Bruno Schröder. Sepals and petals light mauve, labellum ruby-purple with golden lines in the throat.

To *Cypripedium* × 'Redstart,' Exbury var. ('Nubian' × 'Mrs. Cary Batten' (votes 15 for), from Lionel de Rothschild, Esq., Exbury, Southampton. Dorsal sepal rich reddish-purple with vertical lines of a deeper tint, labellum and petals mahogany-red.

Other Exhibits.

Messrs. Black & Flory, Slough: various Cypripediums.

Messrs. McBean, Cooksbridge: *Cypripedium* × 'Josette.'

Mrs. Carl Holmes, Hitchin: *Cypripedium* × 'John Citizen.'

December 15, 1931, Sir JEREMIAH COLMAN, Bt., in the Chair, and thirteen other members present.

Awards Recommended:—

Gold Medal.

To Robert Paterson, Esq., Ardingly, Sussex, for a group.

Silver Banksian Medal.

To Dr. F. Craven Moore, Duckyls, East Grinstead, for Cypripediums.

To Messrs. Sanders, St. Albans, for a group.

To Messrs. Charlesworth, Haywards Heath, for a group.

Banksian Medal.

To Messrs. Stuart Low, Jarvis Brook, for a group.

To Mr. John Evans, Colwyn Bay, for a group.

To Messrs. Keeling & Sons, Bradford, for a group.

To Messrs. Cowan, Southgate, for a group.

First-class Certificate.

To *Sophrolaeliocattleya* × *Shilliana* (*S.-l.-c.* × 'Prince Hirohito' × *L.-c.* × 'Rubicon') (votes unanimous), from Baron Schröder, Englefield Green. Flower of medium size, ruby-crimson, the labellum with a golden throat.

Award of Merit.

To *Cattleya* × 'Mrs. James Watson' var. 'Gloriosa' (*C. Trianae* × *C.* × 'Maggie Raphael') (votes 10 for), from Baron Schröder, Englefield Green. Flower of thick texture, sepals and petals white, labellum purple tinged with crimson.

To *Cypripedium* × 'Miss Audrey Harmer' var. 'Euryrickards' ('Eurybiades' × 'Mrs. Rickards') (votes 11 for, 4 against), from Mrs. Carl Holmes, Codicote, Hitchin. A round flower, the dorsal sepal greenish with a white border, the petals yellowish shaded with mahogany-red.

To *Odontioda* × 'Acis' var. *cruenta* (*Oda.* × 'Royal Gem' × *Oda.* × 'Orion') (votes 10 for, 3 against), from Messrs. Charlesworth, Haywards Heath. Spike of fifteen flowers, claret-red bordered with rose-purple.

To *Cypripedium* × 'John Henry,' Stonehurst var. ('Alcibiades' × 'Robert Paterson') (votes 10 for, 3 against), from R. Paterson, Esq., Ardingly, Sussex. Dorsal sepal white with a greenish base, petals yellowish with brown suffusion.

Cultural Commendation.

To Messrs. Armstrong & Brown, Tunbridge Wells, for *Odontoglossum crispum* var. 'The Baron,' with a spike of twenty flowers.

To Mr. C. V. Kent, Orchid grower to E. R. Ashton, Esq., Tunbridge Wells, for *Masdevallia tovarensis*, with forty flower-spikes; and for *Sophronitis grandiflora*, with thirty flowers.

To Mr. A. Merry, Orchid grower to R. Paterson, Esq., Ardingly, for *Brassocattleya* × 'British Queen' var. 'Olympic' with six flowers.

To Messrs. Stuart Low, Jarvis Brook, for *Eulophiella* × *Rolfei*, with two spikes, each having about thirty-six flowers and buds.

Other Exhibits.

G. P. Harben, Esq., King's Somborne: *Cypripedium* × 'Cathleen.'

Messrs. Burstow, Haywards Heath: *Cymbidium* × 'Lucastes.'

F. J. Hanbury, Esq., East Grinstead: *Odontioda* × 'Brockhurst.'

Messrs. Mansell & Hatcher, Rawdon: *Vanda* × *Mansellii.*

Messrs. H. G. Alexander, Tetbury: *Cypripediums.*

A. E. Dale, Esq., Wirral: *Cypripedium* × 'Ardaco.'

Messrs. Harry Dixon, Wandsworth Common: various Orchids.

January 12, 1932, LIONEL DE ROTHSCHILD, Esq., in the Chair, and sixteen other members present.

Awards Recommended:—

Gold Medal.

To Miss A. B. Moore, Chardwar, Bourton-on-the-Water, Glos., for Cypripediums.

To Messrs. Alexander, Tetbury, Glos., for Cypripediums.

To Messrs. Armstrong & Brown, Tunbridge Wells, for a group.

Silver-gilt Medal.

To Dr. F. Craven Moore, Duckyls, East Grinstead, for Cypripediums.

To Lady Aberconway and the Hon. H. D. McLaren, Bodnant, Tal-y-Cafn, for Cypripediums.

To Messrs. Charlesworth, Haywards Heath, for a group.

Silver Banksian Medal.

To S. G. Brown, Esq., Shepperton, for a group.

To Messrs. Sanders, St. Albans, for a group.

To Messrs. McBean, Cooksbridge, for a group.

Banksian Medal.

To Messrs. Stuart Low, Jarvis Brook, for a group.

To Messrs. Cowan, Southgate, for a group.

To Mr. John Evans, Colwyn Bay, for a group.

First-class Certificate.

To *Bulbophyllum Fletcherianum* (votes 13 for), a remarkable species from New Guinea. The flowers, produced in a cluster, are mainly claret-red. Exhibited by S. G. Brown, Esq., Shepperton, with a spike of 27 flowers, and by Messrs. Sanders with a spike of 23 flowers.

To *Cypripedium* × 'Lady Stanton' ('Memoria H. J. Elwes' × 'Charlotte Dillon') (votes 10 for, 4 against), from Miss A. B. Moore, Chardwar, Bourton-on-the-Water, Glos. The dorsal sepal is pale green with a white margin and profusely spotted; the petals unusually broad, mahogany-red with a yellowish margin.

To *Vuylstekeara* × *ignescens* var. 'Velours' (*Miltonioda* × *Harwoodii* × *Odontoglossum Harryanum*) (votes 10 for, 4 against), from Mrs. Bruce and Miss Wrigley, Bury, Lancs. A distinct flower in which the segments are velvety red-brown margined with cream-white.

Award of Merit.

To *Cypripedium* × 'Everest' ('Gertrude West' × 'Robert Paterson') (votes 13 for), from Robert Paterson, Esq., Ardingly, Sussex. The large dorsal sepal is white with heavy purple spotting; petals brown on the upper half, greenish on the lower portion.

To *Cypripedium* × 'Kanchanjanga' ('Warrior' × 'The Princess') (votes 12 for, 3 against), from Robert Paterson, Esq. The dorsal sepal is white with purple spotting and a green base.

To *Miltonia* × 'Lycaena,' Clovelly var. ('Lord Lambourne' × 'Princess Margaret') (votes 14 for), from Frank Mercer, Esq., Steyning, Sussex. Sepals marked with crimson, petals heavily stained with similar colour; labellum lilac-rose with crimson on the central area.

To *Cypripedium* × 'Walter Moore' var. 'Constance' ('Mrs. Eley' × 'Gwen Hannen') (votes 12 for, 2 against), from Miss A. B. Moore. Light greenish-yellow with venation of a darker tint.

To *Cypripedium* × 'Jungfrau,' Orchidhurst var. ('Miss Audrey Locke' × 'Christopher') (votes 11 for, 4 against), from Messrs. Armstrong & Brown, Tunbridge Wells. The large flower has a dorsal sepal that is white with a few purplish spots and a greenish base; petals greenish-yellow with brownish veins.

Preliminary Certificate.

To *Odontoglossum* × 'Princess Margaret Rose' ('Minotaur' × 'crispo-Solon') (votes 12 for), from Robert Paterson, Esq. Flower well formed, heavily blotched with magenta-purple.

Other Exhibits.

Messrs. A. J. Keeling, Bradford: Cypripediums.

Messrs. Harry Dixon, Wandsworth Common: species and hybrids.

Alan Gibbs, Esq., Tanglewood, Lisvane, nr. Cardiff: *Cymbidium* × 'Felicity.'

Sir William Cooke, Bt., Wyld Court, Hampstead Norris: *Cymbidium* × 'Adonis.'

Frank Mercer, Esq., Steyning: *Odontoglossum crispum* var. 'Queenie Mercer.'

F. J. Hanbury, Esq., East Grinstead: *Cypripedium* × 'Chardmoore.'

Messrs. Sutton Bros., Hassocks: Cypripediums.

Mr. A. E. Lawrance, of Colombia: semi-established Orchids.

January 26, 1932, F. J. HANBURY, Esq., in the Chair, and fourteen other members present.

Awards Recommended:—

Silver Banksian Medal.

To Messrs. McBean, Cooksbridge, for a group.

To Messrs. H. G. Alexander, Tetbury, for a group.

To Messrs. Stuart Low, Jarvis Brook, for a group.

To Messrs. Charlesworth, Haywards Heath, for a group.

To Messrs. Sanders, St. Albans, for a group.

Banksian Medal.

To Messrs. Cowan, Southgate, for a group.

To Messrs. A. J. Keeling, Bradford, for a group.

First-class Certificate.

To *Dendrobium Victoriae Reginae*, Brockhurst var. (votes 12 for), from F. J. Hanbury, Esq., East Grinstead. The specimen carried 18 flowering growths, and the flowers were of the deepest blue yet seen in the species.

Award of Merit.

To *Calanthe* × *dellensis* ('Stella' × 'Baron Schröder') (unanimous), from Baron Schröder, Englefield Green. Of rich rose-red colour, the lip paler, but with deeper shading on the apex.

To *Cymbidium* × *Schlegelii* var. 'Princess' (*insigne* × *Wiganianum*) (votes 9 for, 1 against), from Messrs. Burstow, Haywards Heath. Flowers large, light rose-pink, labellum spotted with crimson.

To *Cymbidium* × 'Flamenco' ('Flamingo' × *Alexanderi*) (votes 10 for, 1 against), from Messrs. H. G. Alexander. A beautiful form of light blush tint, the labellum rose-tinted and marked with crimson.

To *Cypripedium* × *Archmanii* var. 'Exbury' (*Beeckmannii* × 'Troilus') (votes 8 for, 4 against), from Lionel de Rothschild, Esq., Exbury. A large flower in which the dorsal sepal has a wide, white margin, the petals greenish with red-brown markings.

To *Cymbidium* × 'Ophir' ('Castor' × 'Landrail') (votes 10 for), from Messrs. McBean. Sepals and petals pale blush, labellum white with a red-marked apex.

To *Laeliocattleya* × 'Sunbelle' var. 'Gloriosa' (*L.-c.* × 'Serbia' × *C.* × 'Thora') (votes 9 for, 1 against), from F. J. Hanbury, Esq., East Grinstead. Flower of model form, purplish-rose, the lip with a yellow base and a rose-purple apex.

Cultural Commendation.

To Mr. S. Farnes, Orchid grower to F. J. Hanbury, Esq., for *Dendrobium Victoriae Reginae.*

To Messrs. McBean, for *Cattleya* × 'Tityus' var. 'Profusion,' with a spike of seven flowers.

Other Exhibits.

Robert Paterson, Esq., Ardingly: *Cypripedium* × 'Fullmoon.'

F. J. Hanbury, Esq., East Grinstead: *Cymbidium* × 'Nesta.'

February 9, 1932, Sir JEREMIAH COLMAN, Bt., in the Chair, and thirteen other members present.

Awards Recommended:—

Silver-gilt Banksian Medal.

To Messrs. Black & Flory, Slough, for Cypripediums.

To Messrs. McBean, Cooksbridge, for a group.

Silver Banksian Medal.

To Messrs. Stuart Low, Jarvis Brook, for a group.

Banksian Medal.

To Messrs. Armstrong & Brown, Tunbridge Wells, for a group.

First-class Certificate.

To *Sophrolaeliocattleya* × 'Phena' var. *ignescens* (*S.-l.-c.* × 'Rainbow' × *S.-l.-c.* × 'Meuse') (votes 11 for, 3 against), from Baron Schröder, Englefield Green, Surrey. Of medium size, rich crimson-purple in colour.

Award of Merit.

To *Odontioda* × 'Aphrodora' var. 'Flambeau' (*Odontioda* × 'Aphrodite' × *Odontoglossum* × 'Dora') (votes 8 for, 4 against), from Messrs. Charlesworth, Haywards Heath. Rich mauve-purple with purplish-red markings.

To *Sophrolaeliocattleya* × *Shilliana* var. 'Rubis' (*L.-c.* × 'Rubicon' × *S.-l.-c.* × 'Prince Hirohito') (votes 11 for), from Baron Schröder. Sepals and petals flat, purplish-rose.

To *Cypripedium* × 'Commander Wethey' ('Jack' × Gold Mohur') (votes 12 for, 1 against), from Miss A. B. Moore, Chardwar, Bourton-on-the-Water, Glos. Dorsal sepal apple-green, heavily spotted with blackish-purple; petals greenish tinged with brown.

To *Cattleya* × 'Remy Chollet' var. 'Alpha' ('Monarch' × *Trianae*) (votes unanimous), from L. de Rothschild, Esq., Exbury. Flowers large, light mauve, the labellum with a purple front lobe.

To *Odontoglossum* × 'Marcella' var. 'Exbury' (*ardentissimum* × 'The Czar' (votes unanimous), from L. de Rothschild, Esq. Spike of nine large flowers, crimson shaded with mahogany.

To *Odontoglossum crispum* var. 'White Empress' (votes 9 for, 3 against), from F. J. Hanbury, Esq., Brockhurst, East Grinstead. A home-raised form, of thick texture and well formed.

Preliminary Certificate.

Odontoglossum × 'Mandalum' var. 'Colossus' ('Orobus' × *crispum*) (votes 13 for, 1 against), from Messrs. Charlesworth. Flowers large, the round segments marked with purple-red.

Cultural Commendation.

To Mr. B. Hills, Orchid grower to L. de Rothschild, Esq., for *Cattleya* × 'Remy Chollet' var. 'Alpha' with eight large flowers.

To Messrs. McBean, for a fine plant of *Bulbophyllum Fletcherianum.*

Other Exhibits.

Messrs. Charlesworth, Haywards Heath: various Orchids.

Messrs. A. J. Keeling, Bradford: Cypripediums.

February 23, 1932, Sir JEREMIAH COLMAN, Bt., in the Chair, and fifteen other members present.

Awards Recommended :—

Gold Medal.

To Messrs. Charlesworth, Haywards Heath, for a group.

Silver-gilt Banksian Medal.

To Messrs. Black & Flory, Slough, for a group.

Silver Banksian Medal.

To Messrs. McBean, Cooksbridge, for a group.

To Messrs. Stuart Low, Jarvis Brook, for a group.

To Messrs. Sanders, St. Albans, for a group.

Banksian Medal.

To Messrs. Cowan, Southgate, for a group.

To Messrs. Harry Dixon, Wandsworth Common, for a group.

To Messrs. A. J. Keeling, Bradford, for a group.

To Messrs. Burstow, Haywards Heath, for a group.

Award of Merit.

To *Cymbidium* × ' Flamingo,' Old Quarry var. (*Alexanderi* × ' Merlin ') (votes 12 for, 1 against), from Messrs. Burstow. Flowers well-formed, ivory-white, labellum marked with crimson on the front lobe.

To *Odontoglossum* × ' Rialto ' (*Wilckeanum* × *citrinum*) (votes unanimous), from Messrs. Charlesworth. Spike of 15 flowers and buds. Each of the white segments bears a bright yellow blotch.

To *Odontoglossum* × ' Belus ' (*crispum* × ' Marcella ') (votes 11 for), from Messrs. Charlesworth. Flowers large, profusely marked with reddish-rose.

To *Brassocattleya* × ' Pallas,' Paterson's var. (*B.-c.* × *Digbyano-Mossiae* × *C. Warscewiczii*) (votes 11 for, 2 against), from R. Paterson, Esq., Ardingly, Sussex. Flower of large size and of bright rose-pink colour.

To *Odontoglossum* × ' Shanghai ' (*harvengtense* × *polyxanthum*) (votes 10 for, 3 against), from R. Paterson, Esq. Spike of 11 flowers, rich yellow, each segment bears a bold red-brown blotch.

Other Exhibits.

F. J. Hanbury, Esq., East Grinstead : *Dendrobium* × ' Gatton Monarch.'

Sir Wm. Cooke, Bt., Hampstead Norris : *Cymbidium* × ' Miranda.'

BOOKS AND PAMPHLETS PRESENTED, PURCHASED, OR REVIEWED DURING THE HALF-YEAR ENDING DECEMBER 31, 1931, AND DEPOSITED IN THE LIBRARY.

1 = Purchased.
2 = Sent for Review.
3 = Presented by Mr. F. J. Chittenden, V.M.H.
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5 = ,, ,, the Author.
6 = ,, ,, the Misses Thornburgh.
7 = ,, ,, Mr. W. Cuthbertson, V.M.H.

Abbreviations.—Col. pls. = coloured plates; illus. = illustrated; rev. = revised; pls. = plates; ed. = editor, edited, or edition; n.d. = no date; n.p. = no place (of publication given).

When books are published in London, the place of publication is not named in the entry.

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FOORD, Mrs., Woking. Grafts of Apple for trial.
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FRY, Miss M., Oxford. Bulbils of Himalayan Lily.
GALTON, Mrs. WHELER, Warwick. Three volumes of Loudon's "Encyclopædia of Gardening."
GAUTREY, H. T., Tottenham. Tomato; Strawberry plants for trial.

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